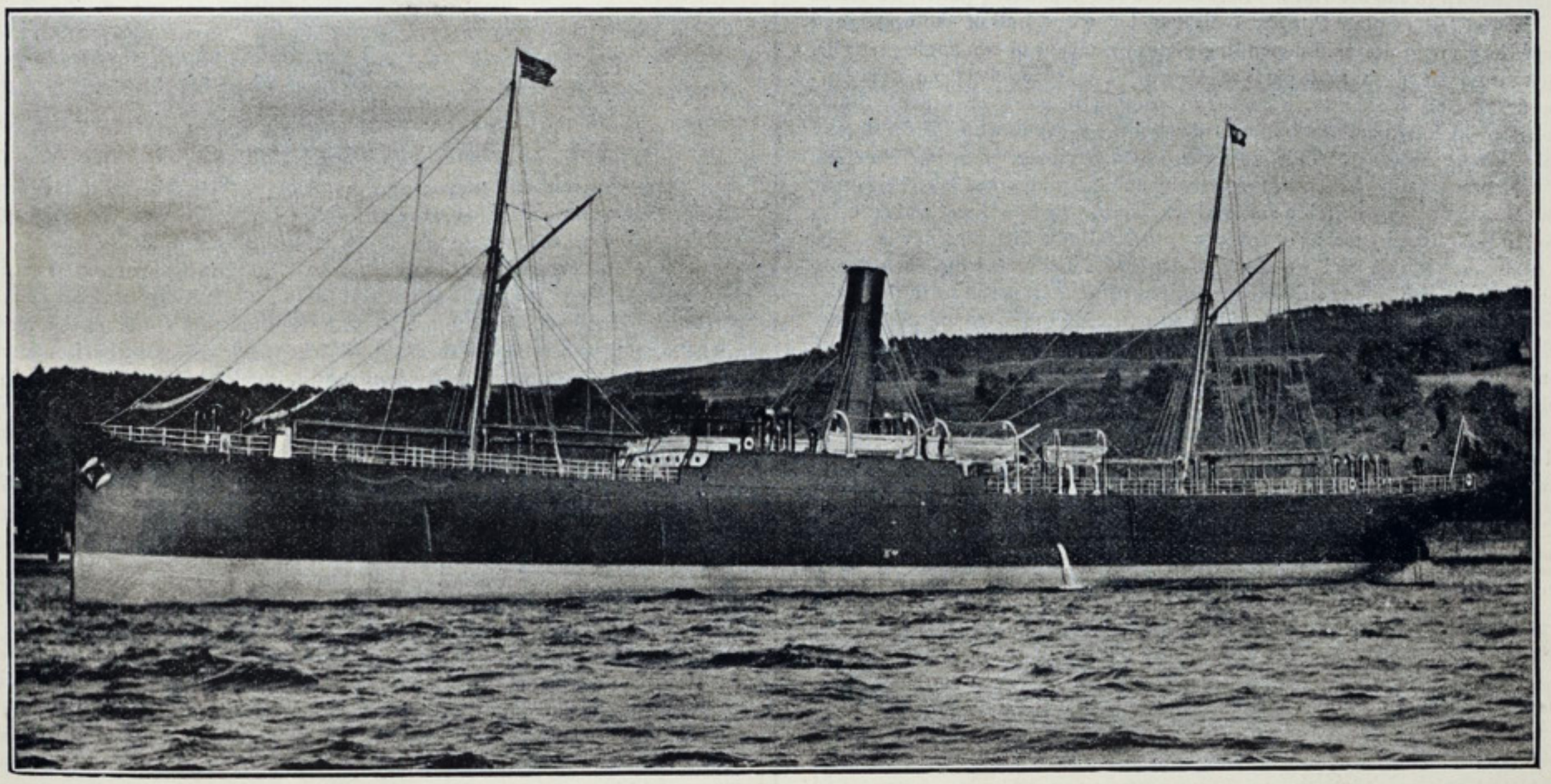
MARINE REVIEW.

VOL. VIII. CLEVELAND, O., AND CHICAGO, ILL., OCT. 26, 1893. No. 17.

Competing With Lake and Rail Lines.

An illustration of one of the new British built ships of the Chesapeake and Ohio Steamship Company appears on this page. As noted in the REVIEW of September 14, when the inauguration of an Atlantic steamship service by the Chesapeake & Ohio Railway Company was referred to at some length, this line, through its alliance with the "Big Four" railway, is becoming a troublesome competitor of the older trunk lines, especially for export grain business. This combination is now said to be taking grain from St. Louis for shipment to Liverpool via the steamship service at Newport News, at rates which have created comment both in railroad and grain exporting circles. The Chesapeake & Ohio, having its own steamers, is enabled to make through rates without conflicting with the provisions of the interstate commerce law, although it is well uuderstood that the proportion which it accepts for the haul must be far below its tariffs for the haul from its own western terminals to the Atlantic seaboard. The rate per 100 pounds on grain from St. Louis to Liverpool is said to have been made as low as 26.8 cents, as against a rate on competing roads from St. Louis to Baltimore of 26 cents per 100 pounds, with an additional freight charge by steamer from Baltimore to Liverpool of about 10 cents. At such figures the southern trunk lines are placed at a great disadvantage by the Newport News route, while the superiority which the northern trunk lines, even in connection with the lake carriers, have enjoyed, is seriously endangered.

The six boats of this new Atlantic line, of which two, the Rappahannock and the Shenandoah, are already in commission, were fully described in the REVIEW of September 12.



CHESAPEAKE AND OHIO STEAMER RAPPAHANNOCK.

Prospects of a Chance to Bid on Revenue Cutters.

A strong effort is being made in the present Congress to secure appropriations for two new revenue cutters, one for the lakes, to take the place of the Andy Johnson on Lake Michigan, and one for the New England coast. Appropriations for these vessels were also sought in the last Congress without success, but the chances of the appropriations being secured now are more favorable, as the treasury department urgently recommends their construction, on account of the increasing necessity for them, and the House seems to consider the bills providing for them of special importance, as both measures have passed that branch of congress thus early in the present session. These boats will cost about $175,000 each, and it is to be hoped that both of them will be built on the lakes, if the Senate concurs in the action of the House, which now seems very probable. Within the past two or three years lake ship-builders have secured in competition with coast builders contracts for several light-ships and light-house tenders for both the Atlantic and Pacific coasts, and now that orders are scarce in lake yards it is reasonable to suppose that some very low bids for these boats will be forwarded to the treasury department from this section of the country. There can be no objection on account of treaty relations with Great Britain to building both of the boats on the lakes, as the Canadian government recently had constructed at Owen Sound, Ont., two cutters of similar proportions and equipment, for protection of its Atlantic coast fisheries. Pacific coast representatives are also trying to secure an appropriation for a cutter, or more properly a boarding vessel, for service in San Francisco harbor.

A steamer built on the Tees, England, to run between London and Paris direct, has masts, funnels, boats' davits, flying bridge and other deck erections all made to lower, so that the vesssel can pass under the low bridges on the River Seine.

Premiums alone this year on new naval vessels will cost the government about $1,000,000, while Congress will, of course, continue to remit penalties as in the past. The system has many serious disadvantages.

A Patent Keel for Ship.

W. T. Sylven and George W. Coffin, naval officers who have been connected with the light-house board, recently secured letters patent (No. 506,139) on a new form of keel which is thus described in the specifications filed in the patent office:

"In vessels as ordinarily constructed, and more particularly in those formed of iron or steel plates, great trouble and annoyance, and serious injury to the vessel, have been caused in the event of its running aground. In such cases, owing to the construction of the keel and its connections with the plates composing the hull, the former has almost invariably become fractured, and as a result of the severe strains and shocks, the fastenings employed to connect the keel with the vessel have become loose and the water allowed to enter the hull. It is the aim of the present invention to overcome these objections. The invention consists in an improved form of keel, and in the peculiar manner of attaching the same to the hull, whereby in the event of the grounding of the same, the fastenings will remain intact and leakage and injury to the bottom of the vessel will be prevented. Fig. 1 is a side elevation of a vessel provided with a keel constructed in accordance with our invention. Fig 2 is a vertical cross section of the same. Fig. 3 is a longitudinal section through, the same. In these drawings we have represented our keel applied to a vessel having the hull proper composed of steel plates overlapped and riveted or otherwise firmly secured to the ribs or framing of the vessel. In providing a vessel of this character with our keel, we apply to the central bottom plates of the hull two depending parallel plates A, which extend longitudinally of the vessel from the stem to the stern and there terminate in advance of the stern post. These plates are secured by means of two longitudinal angle plates B, which are applied on the outer sides of the depending plates against the same and the central plate of the hull, and are riveted to said parts at intervals, as plainly shown in the drawings. Between the two depending plates, we locate a horizontal rail or plate C, a short distance below the hull of the vessel, and secure the same to the said depending plates by means of two angle plates D, which are riveted to said parts as shown. The space between this horizontal rail and the hull we prefer to pack with pitch or other suitable material, which will act as a buffer to deaden the shock to which the keel may in practice be subjected. This, however, we do not deem essential. Beneath the rail C, we apply between the two depending plates the keel E, proper, which may be of any suitable material, preferably of wood, and which is secured to the plates by means of spikes or other suitable fastening devices. To the under side of this keel we apply a false keel *e*, and secure the same firmly to the keel proper by any suitable means, but preferably as shown in the drawings by a series of vertical plates *e'* spiked to the keel proper and to the false keel, and located at intervals throughout the length. In event of such a vessel running aground, the first portion of the keel to give away will be the false keel *e*, its destruction obviously working no serious injury to the vessel. In event of the shock being more violent the keel proper would suffer injury, and might in certain cases cause the lower edges of the vertical plates to bend outward, but, owing to their connection with the horizontal rail C, the strain

Fig. 1.

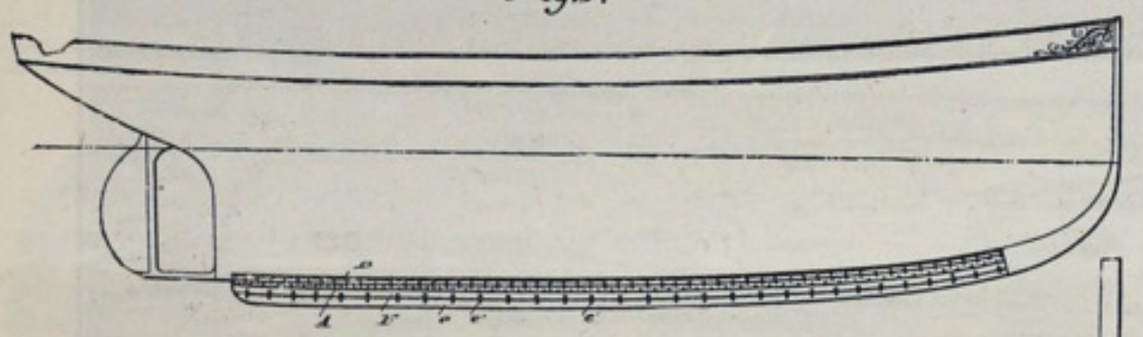
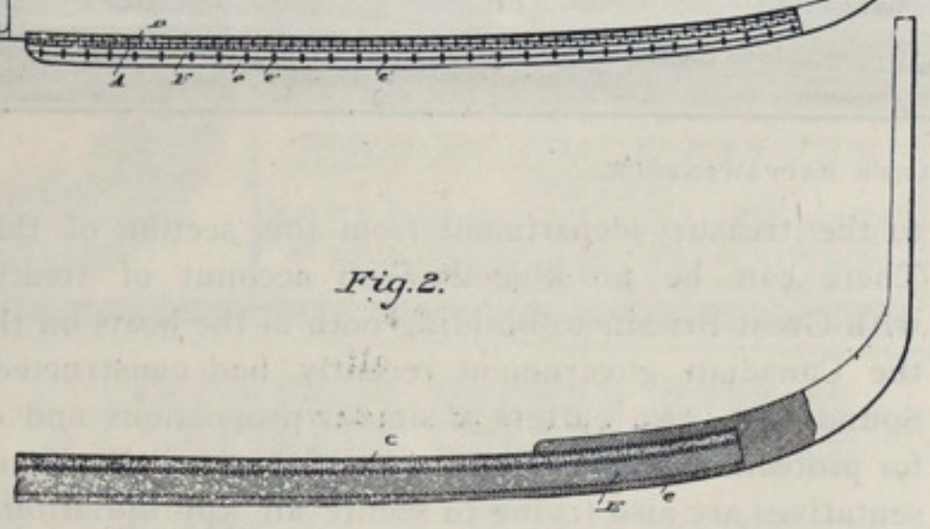


Fig. 2.

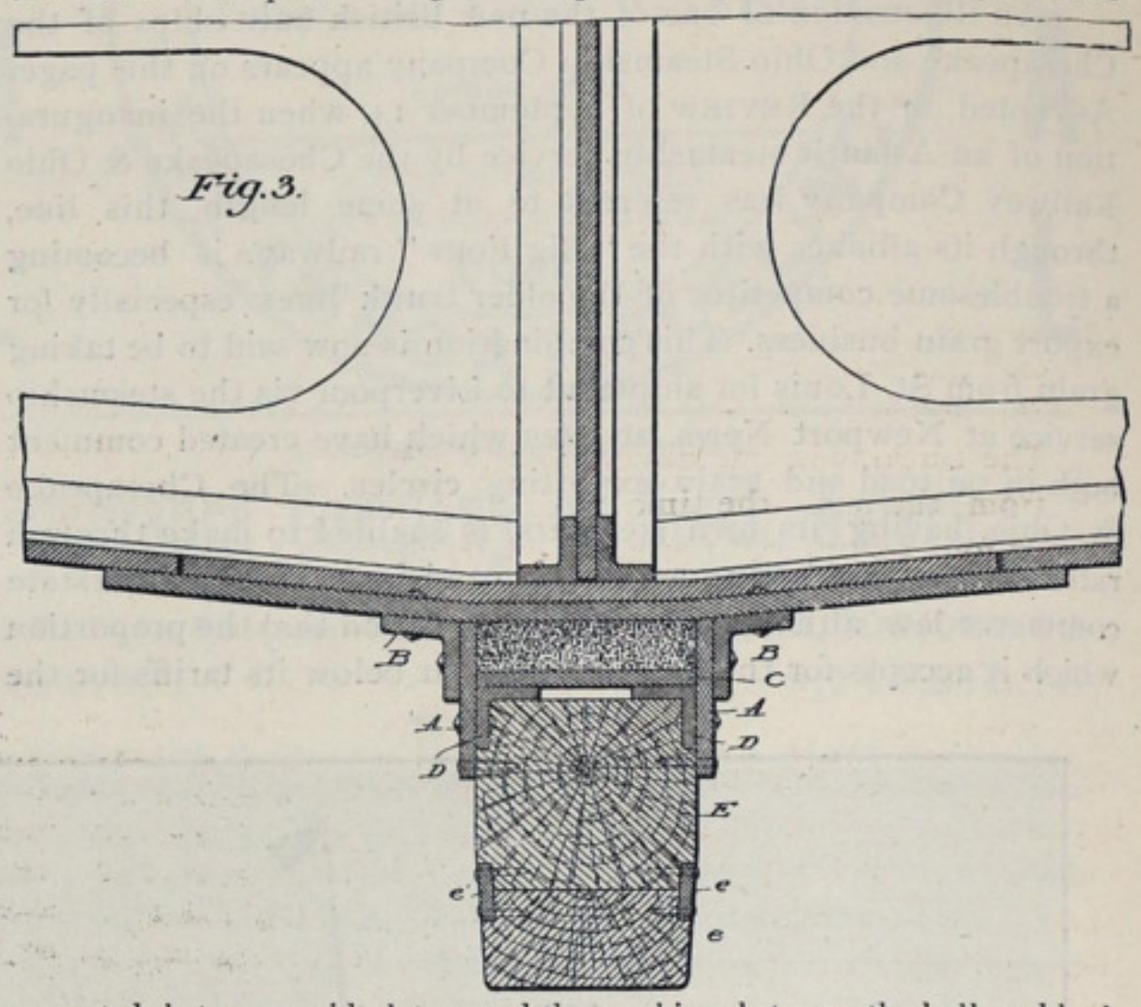


would not be transmitted to the rivets connecting with the hull, and consequently there would be no liability of the vessel leaking.

"It will be noted that the keel proper is sustained and protected by a series of plates, which are connected and firmly braced, so that there will be little danger of the fastenings securing these plates to the hull becoming loose on account of the shocks to which the keel would be subjected in practice. The rear ends of the depending plates, the keel proper and false keel, are rounded off, as shown, to present a finished appearance, and their front ends terminate and are seated in a recess formed in the stem, the line of the keel at this point being thus continuous and unbroken. In terminating the keel at the rear in advance of the stern post, there will be no liability of the latter becoming injured in the event of the vessel grounding, as the keel extends somewhat below the stern post, and will thus act as a guard. It is, of course, understood that our improved construction may be employed in the so called rolling or bilge keels without modification, the action being substantially the same. Various changes in the details of construction employed, which will suggest themselves to the skilled mechanic, may be made without departing from the limits of the invention, provided the functions and action of the device are not materially different from those indicated.

"Having thus described our invention, what we claim is: First—The combination with the hull of a vessel of the keel applied exteriorly, and a packing between the hull and keel. Second—The combination with the hull of a vessel of the parallel longitudinal plates depending therefrom, the keel

Fig. 3.



supported between said plates, and the packing between the hull and keel. Third—The combination with the hull of a vessel of the parallel longitudinal plates secured to the outside thereof in vertical position, the horizontal plate connecting said vertical plates below the hull, and the keel supported between said vertical plates below the horizontal plates, substantially as shown and described. Fourth—The combination with the hull of a vessel of the vertical plates secured to the bottom thereof parallel to each other, the horizontal plate connecting the vertical plates below the hull, the keel below, and adjacent to the horizontal plate, and the packing between the horizontal plate and the hull. Fifth—The combination with the hull, of the two depending plates, the angle plates riveted to the said depending plates and hull respectively, the transverse plate located between the depending plates, the two angle plates riveted to the said transverse plates and depending plates, and the keel located between the said depending plates and secured thereto."

A Lighterage Scheme.

EDITOR MARINE REVIEW: Now that American lake steamers of late design have placed older vessels in the rear, why would it not be possible, in event of the inability of the older steamers to compete at all with the new ones, to adopt a system of lighterage in the Lake Superior trade, in which the old vessels might be used to advantage. Let the big boats leave ports loaded to the full capacity of channels other than those of the St. Mary's river and canal. They could be met by the lighters at a distance of say 40 miles from the canal and relieved of part of their cargo while running, which could be loaded again upon reaching deep water. The boats used as lighters could be fitted with the necessary machinery for rapid work. In this way there would be little loss of time and the modern boats could carry full cargoes.

Sudbury, Ont. T. M. KIRKWOOD.

[This scheme sounds well enough on paper, but it is a slow and difficult task to transfer cargo from one steamer to another even when the boats are at a stand-still in smooth water. The plan does not seem practical.]

Inventions of a Marine Nature.

Specially reported from the patent office, Washington, D. C., for the MARINE REVIEW.

506,406—Recording speed indicator and alarm, by Geo. T. McLaughlan and James Naylor, Jr., of Boston; filed Jan. 4, 1893.

506,573—Propellor, by Nicholas Wagener of Baltimore, Md.; filed Nov. 24, 1890. The screw is a true one and with blades attached to a straight hub. The outer edges of the blades are connected by a continuous web or band.

Copies of specifications accompanying these patents can be had at 15 cents each upon application to the MARINE REVIEW, 516 Perry-Payne building, Cleveland, O.

The publication containing proceedings of the marine and naval branch, engineering congress, is about ready for delivery. Order through the MARINE REVIEW. Price $10 on delivery.

The Atlantic Record.

Between 1888 and 1892 the steamers of the Inman and White Star lines by competitive effort reduced the Atlantic passage by 11 hours and 20 minutes, and now the Cunard steamers Campania and Lucania, which have secured the credit associated with the record for both eastward and westward passages, have entered upon a course of record breaking runs. The progress made since the credit was due to the performances of the Umbria and Etruria is noted in the following tables:

WESTWARD.

		Days. D.	Hrs. H.	Min. M.	Knots. K.
1888	Etruria	6	1	45 =	19.3
1892	Paris	5	14	24 =	20.7
1893	Lucania	5	13	45 =	20.75

EASTWARD.

1888	Umbria	6	3	12 =	19.1
1892	New York	5	19	57 =	20.10
1893	Campania	5	14	24 =	20.94

The Lucania in one day made 560 miles. As she was steaming from the sun, the time from noon to noon was over the twenty four hours, and the mean speed works out o 22½ knots.

Favorable to Protection for Shipping.

Mr. Richard P. Joy of Detroit has of late manifested a very strong interest in the merchant marine of this country. He has written for various publications a large number of articles favoring subsidies to American ships, and has just had these articles collected and printed in pamphlet form under the title of "How Shall We Re-establish the American Merchant Marine." Some two years ago, in a voyage around the world, Mr. Joy was much impressed by the total absence of the American flag from the seas, and determined that upon his arrival home he would investigate the causes of the decline of American shipping. In studying the question, the conclusion which he reached was, that the American merchant marine has been and is declining from lack of proper encouragement and protection from the government. He accordingly began writing the articles now printed collectively, in the introduction to which he says:

"The exchange of gold for transportation is an unequal one; it is not like the exchange of money for the coin, but in transportation you have naught but the act performed, and that by foreigners. Therefore it must be a constant drain on the United States to continually pay to foreigners for transportation, for which we receive nothing that enriches the country. Naturally foreign nations would complain at seeing the United States endeavoring to obtain a foothold on the seas, from which we have been driven by those nations by fair means and foul. We must expect opposition to such a policy from foreign nations, as in recovering our carrying trade we deprive them of the same. Every country is justified in protecting its marine, and if the United States has been backward in so doing, we are to blame.

"This is a subject in which every citizen of the United States is interested. If the marine is rebuilt in American shipyards, it means the employment of thousands of shipwrights and iron workers; the steel and iron manufactories will be taxed to their utmost capacity to furnish material, and no hing but general prosperity can result. The protection extended our coastwise commerce, by prohibiting foreign ships engaging in it, has built up a coastwise marine unequaled by any country in the world. The cost of vessels has been greatly lowered, by internal competition between our ship builders, and a very efficient and superior class of vessels is the result. Our naval architects, in their endeavors to obtain the most efficient craft possible, have evolved many different types, among them the whaleback, straightback, etc.; also innumerable labor saving devices. Would these results have been achieved, and many others sure to follow, if we had, or are to become dependent upon foreign shipyards for our vessels, as those who advocate free ships would have us? The designing and building of ships go together, and the foreign builder would not surely have the same interest in producing as efficient a vessel as would our own ship builders.

"Both political parties are much to blame for permitting the merchant marine to drift into its present deplorable condition for lack of proper legislation. Our congress thinks nothing of granting millions of dollars in land grants to railroads, and spending vast sums on improving our rivers and harbors, but the moment a bill praying for subsidy to keep our struggling oversea shipping alive comes before them, they fail to see that the country will receive any benefit from it. Probably few of the members of Congress appreciate that the people of the United States pay more than two-thirds to support all the foreign steamship lines between this country and Europe, and that all this money goes into foreign pockets. It is proposed to create a department of commerce, that our navigation interests may be represented in the president's cabinet. Such a step could not but result in great good to all our navigation interests, and would be a great stride towards aiding our marine."

The pamphlet may be had by addressing Richard P. Joy, No. 215 Hammond building, Detroit, Mich.

A Bill That Should be Killed.

Representative Dunphy has introduced in Congress a bill that will very probably cause the vessel interests of this country considerable annoyance, unless it is killed in committee. The measure (H. R. 3,776,) which has been referred to the House committee on commerce, provides simply that sections 4,488 and 4,489 of the revised statutes be so amended as to insert after the words "life preservers," wherever they occur, the words "ship's telemeter or position finder." The sections of the United States statutes here referred to are those governing the equipment of steam vessels under the direction of the steamboat inspection service, and if this bill should become a law every steam vessel of the United States would be compelled to carry, in addition to present equipment, a ship's telemeter or position finder, just as it was sought some time ago to compel all vessels to carry projectiles and guns, with which to throw life lines to shore. A naval officer who recently invented a ship's telemeter has undoubtedly prompted the introduction of this bill. His instrument may be a very good thing of its kind, but should not be forced upon vessel owners by special legislation.

Publications.

"The Cunard line and the World's Fair" is the title of as handsome and interesting a book as has ever been issued by a steamship company. It contains a large number of photo-gravure full page illustrations and is substantially bound. The diagrams attached showing the advancement in hulls and engines of this ocean line are valuable. The technical descriptions of the latest additions to their fleet, the Campania and Lucania, will interest any one who has made an ocean voyage or is in any way curious about the sea and the vessels that traverse it. The illustrations of the world's fair which the book contains are worth the price that is charged to prevent it from falling into the hands of those who would not appreciate it. Vernon H. Brown, Bowling Green, New York, N. Y., will mail it to any address on receipt of $1.

A history of the world's fair with illustrations and descriptions of the most interesting exhibits will be in demand for some time to come. There will be hundreds of such books published, all claiming to be the best and the purchaser who is unacquainted with publications in general, will hardly be able to select the best of them or satisfy himself as to the most reliable publisher. After examining "The Book of the Fair" there is little hesitancy in stating that so far it is the best and most reliable yet published, and it will be difficult for other publishers to surpass it. It is published in 25 parts at $1 a part. Write the Bancroft Company, Auditorium Building, Chicago, Ill., concerning it.

John H. Smith.

In the death of John H. Smith the ship building industry of the lakes suffers the loss of a prominent leader. Vessel owners and underwriters, who are accustomed to dealing with men in business affairs only as they are inclined by the cold, practical methods that control business transactions, are now prompted, in common with a small army of ship yard workmen, to express their regard for a man who was peculiarly adapted to accomplishing great aims, and at the same time winning confidence and friendship. John Smith did not appear as an important figure in the Globe Iron Works Company outside of the ship yard, but the important part which he had taken in the building up at that very large industrial institution was fully understood to the most influential representatives of the shipping interests who had direct dealings with him.

The iron steamer Onoko, the first large boat built by the Globe Ship Building Company (now the Globe Iron Works Company) was among the first metal boats built on the lakes. Mr. Smith superintended the building of this boat and since managed all of the ship yard detail attending the construction of a fleet of fifty steel steamers, some of them costing more than $250,000 and few of them less than $150,000 each. He had grown up with the establishment and with the great strides made in steel ship building on the lakes. In the ship yard he displayed all the qualities of the type of men who make good generals. He never seemed to have one too many in the force of workmen engaged at any particular job, but always enough, and possessed the faculty of organizing workmen to advantage, while retaining their support and good will. In the work of repairing steel ships it is probably not too much to say that he had no superior in this country, and it was in this regard that he had especially gained the confidence of owners and underwriters, who were invariably willing to entrust matters of great importance to his integrity and reputation for doing only the best of work. Energy and self reliance had gained for him the power maintaining a position upon which he was decided, even against opposition in some cases from those higher in authority, and as for his convincing qualities in argument, those who knew him well and have had occasion to differ with him, have only to recall his accustomed position at a side wall, or bending over a piece of plate, with chalk in one hand and the large index finger of the other pointing out the advantageous features of a rough drawn plan. He had been sick for about four months, but death was hardly expected when it occurred. The funeral, which was very largely attended, was a fitting tribute to his memory.

John H. Smith was born in Pembrickshire, South Wales, forty-seven years ago, and his first work in iron was in Hull, Yorkshire, and later in London. While engaged in government dock yards he worked on the war ships Northumberland, Minotaur, Agincourt, Black Prince and others. Before leaving England he was also engaged for a time in private dock yards, improving upon the experience gained in naval work. About the year 1869 he came to the United States, and in 1871 helped to build the iron steamer Japan at the Union rolling mill yard, Buffalo. About this time he entered the employ of the Anchor line and executed a big repair job on one of the boats of that line at Erie. The work attracted a great deal of attention, as the expense of putting the boat in dock was saved by listing her on the river bank. His reputation as an iron worker led the Grand Trunk railway to engage him to superintend the construction of the iron car ferry International, which was engaged at Port Huron until the tunnel was built. The material, frames, etc., for this boat were shipped from England. Leaving the lakes for a time, Mr. Smith built a blast furnace on Lake Champlain, New York, but was sent for later by the Grand Trunk railway to construct a second car ferry, the Huron, which was put together at Point Edward. On the completion of this work he was appointed superintendent of bridges on the same railway, which position he held until engaged by the Globe Ship Building Company at Cleveland as superintendent.

Tips From the Man on the Dock.

In the coat pocket of one of the unfortunate sailors of the lost steamer, Wocoken, whose body was given up by Lake Erie a few days ago, there was found a particularly pathetic letter. It was from a loving wife in a farm home to a faithful husband, and I print it, without names, for the purpose of directing attention to a plan that has been suggested for the care of the numerous widows and orphans who are left helpless by such storms as that of a fortnight ago:

Dear Husband—I now sit down to write you a few lines in return for your letter which I received Tuesday. It found us all quite well. Baby has got his four upper teeth and four under teeth. He has got one since you went away. Now his double teeth are going to come before long. One is quite sharp now and you can feel it real plain (that is if you put your finger in his mouth). I weaned the baby last Saturday and did not have any trouble with him. He didn't seem to care anything about it. He rocks to sleep as nice as can be. You remember when you were home, he was trying to get on the lounge. The next day after you went off he got on alone and then got off, and so now he gets on and off whenever he has a mind to. In the morning when I get up he gets right up alone. He gets out backwards of course. I went to Perry with Gussie Monday after the shoes and took baby with me. He hollered at everybody he saw going home. He slept going up to Perry. You know the banana I put under the seat. Baby ate every bit of it himself. He liked it awful well. I let Charley have the lard. It came to $1.99½, so he called it $2. There were 14¼ pounds at 14 cents a pound. Charley ——— got a bushel of potatoes of me last Saturday evening. He gave 70 cents for the bushel and said he would take another bushel Saturday. Gussie and I are going to Geneva today with the beans and are going to try and get the baby's picture taken. So I will close, love. I guess I will send this to Ashtabula so you will be sure to get it when you come down. Come home if you can and if you cannot, why of course, write. Good bye, ———

What an example in two lives of simple happiness, refinement and modest ambitions, to be crushed out when least expected! And how many more similar cases are there to be found, resulting from the loss of sixty or more lives in the same storm? Newspaper reports do not tell of them. They stop with reciting the circumstances attending the foundering or stranding of the different vessels, and noting the names of the lost. The rest is left to the poor widows and orphans, and their little circle of acquaintances.

But there is a humane side of this subject that should assert itself. I have no patience with the calamity howler who would hold the vessel owner responsible for an act of God, but the vessel owner has it within his power to devise some plan by means of which the widows and orphans may be at least partially provided for in life. One method that has met with approval wherever it has been spoken of, is that of securing the enactment of a federal law that will assess upon vessels according to their tonnage, and sailors according to their earnings, a small tax, to be put into a general fund, and applied to the purpose here noted. It may be claimed that such a law would not be constitutional, but the same objection was made to the law upon which the present government marine hospital service was built up. The constitutionality of the collection of funds for hospital purposes was never tested, on account of its justice, and it is certain that legislation of the kind now proposed would meet with little if any opposition.

Although I have had occasion to refer here to the loss of the Wocoken, I would not have it understood that there is any intention of connecting the disaster to that boat with the foregoing criticisms. On the contrary, the owners of the Wocoken have gone further than has ever been known before in searching for bodies from the wreck, and their action in undertaking heavy expense for tug hire, and the embalming and burial of bodies that have been found, is highly commendable.

Eight Vessel Masters Among the Lost.

The names of eight veteran vessel masters appear in the list of about sixty lives lost in the gale of the 14th and 15th inst. On the steamer Wocoken, two men who have given up many years to lake service were numbered among the lost. Capt. Albert Meswald of Marine City, a German by birth, and forty-five years of age at his death, was but fourteen years old when he enlisted in the Union army during the war of the rebellion; and he began sailing out of Detroit three years later. Last season he was in the steamer Huron City, and had undoubtedly figured on a prosperous future when he was able to purchase an interest in the Wocoken on the opening of the present season. Capt. David Jones, who was first mate with Capt. Meswald, sailed the steamer Fairbank during the early part of the season, and had been mate in seasons past on some of the best steel boats in the iron trade.

Capt. George W. Stoddard of the Dean Richmond was fifty-four years of age and had been sailing from boyhood. He was for eleven years in the Erie railway line between Toledo and Buffalo, and was master of different boats. He was in the Wabash line steamer John C. Gault for five years, and was superintendent of construction and repairs of the line. He was in the passenger steamer Mascot for one season, between Toledo and Point au Pelee, and owned an interest in her. Thereafter he was in the Vermont line steamer Newburg. The next two seasons he was in the big steamer Northern light, of the Northern steamship line, between Buffalo and Duluth. He then became master of the passenger steamer Shrewsbury, between Buffalo and Niagara Falls. Last season he sailed the steamer B. W. Blanchard, and this season the Dean Richmond. He commanded lake steamers for twenty years in all. He was president of Toledo lodge, Shipmasters' Association.

There probably was no more capable master of sailing vessels on the lakes than Capt. John Duff, who was lost with all hands on Lake Erie in the schooner Benson, which he owned and sailed for many years. Twice he had taken the Benson across the Atlantic and to South America waters, and returned in safety. He had the most implicit confidence in the staunchness of the vessel and in his own skill as a seaman.

Capt. Louis Guthrie, who died from exposure and exhaustion on the waterlogged barge Annie Sherwood, was a resident of Chicago. Among his commands on the lakes at different periods were the schooner Lucia A. Simpson and steamer Joys. During the early months of the present season he commanded the steamer Johnson, formerly the D. W. Powers. Capt. Guthrie was a man of more than ordinary ability and culture. He had attained the age of forty-nine years, and leaves a wife and three children.

Two of the victims of the Riverside disaster on Lake Erie were also men who have long been in charge of lake vessels. Capt. Joseph Hargrove, mate of the schooner, was one of the best known sailors on the lakes. He was fifty-three years old and commenced sailing when he was sixteen. Capt. Hargrove commanded a good many of the old-time vessels, among them being the Montauk, Lady Moulton, Ontario and Jenny Lind. About thirteen years ago he determined to retire and settled down on his farm at Picton, Ont., the last boat he sailed being the British Queen. Capt. D. J. Farrington, master of the Riverside, was a nephew of Capt. Hargrove, and he, together with John Hargrove, Capt. Hargrove's son, had only recently purchased an interest in the vessel, this being their third trip as owners. Capt. Hargrove made up his mind to sail a few trips with the boys and joined them on the fatal trip. This was his first appearance on board a vessel since his retirement thirteen years ago. Capt. Ferrington was also from Picton, Ont., and a sad feature of the disaster was the loss of his wife, to whom he had been married only a few weeks, and who was sailing with him.

Capt. John Rafferty, the lost first mate of the schooner Minnehaha, had for several years been in boats controlled by Capt. John T. Hutchinson of Cleveland. He was about fifty years of age. His home was in West Cleveland, (a suburb of Cleveland), where his wife and four daughters now mourn his loss.

A System of Double Taxation.

In accordance with the decision reached some time ago by the board in charge of the equalization of taxes in Cleveland, a number of owners and part owners of vessels registered in the Cleveland custom house have received a circular letter, which reads as follows:

"In accordance with an opinion recently given us by our attorney, Hon. James Lawrence, corporation council of the city of Cleveland, our board has decided to list for taxation in Cleveland all vessels or interests in vessels which are entered from the port of Cleveland, irrespective of the residence of the owner, unless it is within the limits of Cuyahoga county. We have also decided to make an addition for the taxes of 1892 of such vessels or interests in vessels. We have therefore ordered an addition for 1892, and listed for taxation for 1893, the following vessel property in your name, with values as follows:"

Then follows a blank form with the name of the vessel, portion owned by the party to whom the circular is addressed, and taxable valuation of said portion of the ship, together with a foot note stating that the taxes for 1892 and 1893 have been charged on the valuations placed in the blank form and will be payable to the treasurer of Cuyahoga county at Cleveland, on or before the 20th day of December next.

One of these circulars was sent back to a Cleveland vessel agent by an owner who resides in the state of Michigan. He had already paid his taxes for 1892 in that state and naturally objects to paying them twice. Perhaps the learned corporation council of the city of Cleveland will be able to convince the Michigan authorities that they ought to stop taxing this class of personal property. Suppose, for instance, that a ship is owned in Michigan except one small share, which is held by a resident of Cleveland. For convenience sake the Cleveland shareholder is named as managing owner. This would require the ship to be registered in the Cleveland customs district, and under this new theory of the board all taxes on her should be paid in the city of Cleveland. Registration at the custom house has heretofore been supposed to be for the purposes and requirements of the Federal government and not for the purpose of city taxes. If carried out this plan is likely to cause some trouble and perhaps litigation.

A Valuable Wrecking Plant.

Capt. George McLeod of Buffalo, who went in the interest of the underwriters to Kingston to look after the stranded steamer Colonial some time ago and also after the Hecla, speaks highly of the wrecking tug Petrel and her equipment. The boat is owned by the Collins Bay Towing and Rafting Company of Kingston and is one of the largest and most powerful wreckers afloat on the lakes. She is built of steel and her bottom is shielded with 4-inch oak; she has two wheels, double engines, twin-screws, and measures 280 tons. The Petrel was built in 1892 and is valued at $52,000.

In Need of a Life Saving Station.

The Dean Richmond disaster has called attention to the fact that there is not one life saving station on Lake Erie between Erie and Buffalo. Had there been a station at or near Dunkirk, Superintendent Kimball of the life saving service believes that many of the crew of the Dean Richmond could have been saved. Representative W. B. Hooker also holds this belief and he proposes to take the proper steps to have a station located at Dunkirk. He will introduce a bill with this end in view, appropriating $10,000, to be immediately available.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

Chicago office, (branch), No. 706 Phoenix building.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,657 vessels, of 1,183,582.55 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1892, was 321 and their aggregate gross tonnage 534,490.27; in all other parts of the country the number of this class of vessels was, on the same date, 217 and their gross tonnage 321,784.6. The classification of the entire lake fleet is as follows:

Class.	Number.	Gross. Tonnage.
Steam vessels	1,631	763,063.32
Sailing vessels	1,226	319,617.61
Canal boats	731	75,580 50
Barges	69	25,321.12
Total	3,657	1,183,582.55

Tonnage built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
1888	222	101,102.87
1889	225	107,080.30
1890	218	108,515.00
1891	204	111,856.45
1892	169	45,168.98
Total	1,038	473,723.60

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal.		
	1892.	1891.	1890.	1892.	1891.	1890.
No. vessel passages	12,580	10,191	10,557	3,559	4,207	3,389
Ton'ge, net regist'd	10,647,203	8,400,685	8,454,435	7,712,028	8,698,777	6,890,014
Days of navigation	223	225	228	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

IN AN article that attempts to blame vessel masters and owners for loss of life on the lakes during the recent heavy storm, an editorial writer on one of the daily newspapers declares, with a great display of ignorance as to the relations between underwriters and vessel owners, that if the vessel men had given heed to the warnings of the weather bureau there would have been no loss of life. As a matter of fact, the warnings from the officers of the weather bureau on the lakes regarding the storm referred to were very much mixed up, they having predicted some twenty-four hours in advance a storm from the northeast, which failed to materialize, and the absence of which was especially misleading, on account of the disastrous cyclone from northwest to southwest that followed later, and which was predicted only a few hours in advance. It is not the purpose here to criticize the general service of the weather bureau, which has reached a standard higher than that of any other country in the world, but it is certainly aggravating to know that in some cases ridiculous charges of the kind noted against the shipping interests are prompted by a tendency in the service to lay claim to a degree of merit bordering on infallibility. It is hardly necessary to note that the vessel owner who would regulate entirely the movements of his ship in accordance with the prognostications of the weather bureau would pile up a bill of shore expenses in a season or two that would send him to the poor house. Just now there is a rivalry on the lakes between the weather bureau and the hydrographic service, the latter having established recently an office at Chicago. The rivalry is not new, as the work of these two branches of the government under different departments is somewhat similar, and they have already had their little differences on the coast, the one charging the other with following in its wake, both as to the kind of service rendered and the sections of the country covered. The new work so far undertaken here by either of these bureaus, such as the drift of currents and marine meteorology, may have resulted in special advantages to science when applied to the broad expanse of the Atlantic, but it would seem that the government funds laid out in this way for salaries, office expenses and unlimited supplies of printed matter might better be applied to channel improvements and other purposes of a direct nature. It may not be the proper course to oppose progress, even in a service that is as far-fetched in its aims as that here referred to, and we do not desire to discourage any master against rendering assistance to the men in charge of this work, but they will do well to adopt simple methods that will show some direct advantages and avoid parading their own ability in cases like that which would have people believe that vessel men rush into disaster in the face of certain warning of its coming.

A YEAR ago the German Reichstag decided that there was danger in the policy of leaving the designing of vessels entirely to the government's chief constructor and private establishments were urged to send in competitive designs for a large armored cruiser. A prize was offered and nine competitors entered the field, of which number five were government naval constructors. After some nine months deliberations, the prize was awarded to the Germania Ship Building Company of Kiel, and the second place was secured by the Vulcan company of Stettin, the design of one of the government constructors being thrown out altogether. Some of the English technical journals are now pronouncing this novel competition a step in the right direction and are urging the admiralty to invite private firms to send in designs for vessels of war. It will thus be seen that in the building of war vessels in private yards the United States government secures a big advantage over European countries, as the navy department, which is in close touch with all the builders, enjoys the benefits of their skill and progress.

A WHEELSMAN on the steamer Merrimac mistook orders given him while the captain was "feeling his way" through Bar point channel Sunday night. As a result the steamer was stranded and a big bill of expense attending her release must be paid by owners or underwriters. Chances are ten to one that this accident is due to the want of uniformity in reeving wheel chains on lake steamers, and that the wheelsman who is charged with mistaking orders had been in the habit of steering according to the method opposite to that which prevails on the Merrimac. It is within the power of the Shipmasters' Association to take up this question of crossed and straight chains during the coming winter and settle it forever, at least as far as the lakes are concerned.

IN ONE important regard the World's Columbian Exposition will be of direct benefit to lake shipping interests. Visitors to the fair were impressed with the high class of ships which they saw, and that they have been led to give some study to our commerce is evidenced by the great number of articles bearing upon the magnitude of lake traffic that are now being published throughout Europe, as well as in eastern cities where the subject had been treated lightly in the past. The great mass of statistics prepared within the past two or three years are now bearing fruit.

IF IT is true, as reported, that the first two American line ships, now building at Cramp's, Philadelphia, are to be named Southampton and Queenstown, the owners of these boats will undoubtedly be confronted with some very severe criticism. A steamship company supported to the extent of probably 95 per cent. by American capital and subsidized by the United States government can not well find an excuse for going to England to select names for two vessels that have been lauded as the forerunners of a fleet of American built ships.

Iron Mining Matters.

Shipments of iron ore from Two Harbors up to and including Wednesday, Oct. 18, aggregated 809,970 gross tons and were divided as follows: Chandler, 393,149 tons; Minnesota, 334,347; Zenith, 12,998; Cincinnati, 9,939; Canton, 24,412; Franklin, 32,949; Hale, 2,176. Shipments of Gogebic range mines through Ashland up to and including Saturday, Oct. 14, foot up 1,037,983 tons, divided among the different mines as follows: Ashland, 32,776 tons; Aurora, 157,978; Colby No. 2, 45,615; Tilden, 126,042; Germania, 4,975; Iron Belt, 17,625; Montreal, south vein, 2,606; Montreal, north vein, 28,803; Eureka, A, 1,949; Brotherton, 14,643; Comet, 8,385; Eureka, 26,028; Careys, 32,514; Newport, 102,860; Norrie, 228,476; East Norrie, 78,135; Palms, 2,302; Pabst, 91,891; Jack Pot, 1,651; Davis, 13,282; Sunday Lake, 19,344.

In nine hours of one day last week 1,950 tons of ore (eighty-nine cars) was mined and loaded by steam shovel at the Biwabik mine, Missabe range. This is at a rate of about 4 tons a minute. Other records said to have been made recently are: At the Oliver, 1,500 tons in seven hours; at the Mountain Iron, 1,700 in nine hours, and at the Biwabik, 3,400 in twenty hours.

According to the Diamond Drill of Crystal Falls, Mich.; the Chicago, Milwaukee & St. Paul Railway is negotiating for the purchase of the Mansfield mine, recently flooded by a big cave in.

The Newport mine, Gogebic range, which has been running steadily all season with a force of about 250 men and has shipped a little more than 100,000 tons of ore has closed down for the season.

Not only has work been suspended at the Pioneer, Vermilion range, but the pumps are out and the mine is flooded.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Oct. 21 1893:

	Wheat, bu.	Corn, bu.
Chicago	18,998,000	2,882,000
Duluth	4,239,000	.....
Milwaukee	750,000	.....
Detroit	1,177,000	4,000
Toledo	1,832,000	225,000
Buffalo	2,909,000	1,054,000
Total	29,905,000	4,165,000

At the points named there is a net increase for the week of 533,000 bushels of wheat and a net decrease of 56,000 bushels of corn.

Largest and Most Powerful Dredger Afloat.

During the past year there has been constructed at the yard of the Naval Construction and Armament Company of Barrow, Eng., a large, powerful twin-screw hopper and sand pump dredger named the Brancker. This vessel, which is by far the largest dredger afloat, has been built to the order of the Mersey docks and harbor board of Liverpool, who have been so satisfied with the experiments made in cutting a channel through the Mersey bar that they have determined to further proceed with dredging operations, so that steamships of the largest tonnage may be enabled to enter the river and harbor in any state of the tide. It is proposed to dredge a channel 1,000 feet wide, and especially buoy it at a cost of $15,000. The Brancker, which was designed by Mr. A. G. Lyster, is of the following dimensions: Length between perpendiculars 320 feet 3 inches; molded breadth 46 feet 10 inches; moulded depth 20 feet 6 inches; gross register tonnage 2,550 tons. She is constructed entirely of steel to meet the requirements of Lloyds' highest class, and is fitted amidships with eight large hoppers—four on each side of the vessel—having a total carrying capacity of 3,000 tons of sand. These hoppers are fitted with Lyster's patent hydraulic discharging apparatus. A well is fitted up the center of the craft between the hoppers, to admit of the working of a sand pump suction tube 45 inches in diameter through the bottom of the vessel. This tube is raised and lowered by hydraulic pressure, and when lowered it can dredge to a depth of 43 feet. Large rectangular landers are fitted above the hoppers, with openings over each compartment to allow of spoil being distributed on the hoppers as required. Two large powerful centrifugal pumps, having suction and discharge pipes 36 inches in diameter, are fitted, they being capable of raising 4,000 tons of sand or mud per hour. These pumps are worked by triple expansion engines, having cylinders 11½, 18 and 29 inches diameter respectively, and a common stroke of 18 inches; the working pressure being 160 pounds. Rudders are fitted both forward and aft controlled by steam steering gear. The propelling motive power of the Brancker consists of two independent sets of vertical inverted direct acting triple expansion engines, driving twin screws and capable of steaming at an 11-knot per hour gait. The work of dredging the Mersey bar was begun about two and a half years ago with two dredges capable of lifting 450 tons of sand per hour. The experiment has been very successful, and the bar is now deepened from 11 feet, its original depth, to 17 feet 6 inches. The Brancker was designed and built to deepen the bar 24 or 25 feet and thus open the River Mersey to the largest class of ships in any state of the tide, and that she will successfully accomplish this has been clearly demonstrated by the fact that on her trial she filled herself with a little over 3,000 tons of sand in just three-quarters of an hour, and during the working hours of the day she filled and emptied herself eight times, raising 24,500 tons of sand.

W. F.

In General.

A tank steamer started from Philadelphia for London, last week, with 1,300,000 gallons of oil in bulk. She is fitted with eleven oil-tight bulkheads. The danger from the oil is minimized by the introduction of revolving fans which carry off the accumulating gas from the tanks.

What is said to be the biggest steel casting that ever came to this country arrived on the steamer Nomadic, from Liverpool, last week. It weighs 65 tons and is part of the new hydraulic forging plant which the Carnegie Steel Company, Limited, is importing to manufacture armor plates.

A cast steel strut for the screw shafts of the first of the new American line ships, being built by the Cramps, weighs 67,135 pounds, or more than 30 tons. It was made by the Standard Steel Casting Company of Thurlow, Pa., and is the largest single casting as yet used in marine work in this country.

After exhaustive experiments in New York harbor with the torpedo boat Cushing to determine the best color to paint such boats in order to escape detection by search lights, it was found that a dull green hue rendered the boat almost indistinguishable from the water. A recommendation is to be made to the navy department that all torpedo boats should be of this color.

Now it is said that Secretary Herbert does not think that the Holland submarine boat, selected by the expert naval board, fulfils all the requirements sufficiently fully to justify him in expending $150,000 in constructing and experimenting with a boat of this type. The secretary believes it will be better to wait awhile before building a submarine vessel, so that time may be allowed for the development of a thoroughly trustworthy one.

A French engineering journal referring to dependence upon calculations among naval architects of France says: "It would be absurd to say that the English do not know how to build ships, but they have not the same mathematical faith in the result of calculations. They leave much to chance and empiricism, and the catastrophies which have occurred to their navy are the consequence of their carelessness and contempt of mathematical laws."

Although the Hamburg-American Packet Company has just let contracts for two steamers to be built at Stettin and Hamburg, and is also having two boats built at Harland & Wolff's, Belfast, tenders are now solicited for another boat for the big German line. This latest steamer will be of the twin-screw type and is for the Hamburg-New York route. She will be of about 8,000 tons deadweight and will be fitted for carrying about 2,500 third-class passengers.

An Ignorant Captain.

Old lady—What is the matter now?

Steamboat captain—We've run on a sand-bar.

Old lady—Well, why don't you go over it? What's your walking beam for, I'd like to know?—New York Weekly.

Around the Lakes.

Grain in store at Duluth and Superior aggregates about 4,500,000 bushels.

The steel steamer Centurion is credited with making the run from Buffalo to Duluth in sixty-eight hours.

Capt. James Davidson is building three large wooden vessels at West Bay City, two steamers and a schooner.

It is not generally known that the centerboard type of boat was first introduced in America on the lakes during the war of the revolution.

In accordance with a request from the treasury department Nels A. Peterson has forwarded to Washington his resignation as captain of the Milwaukee life saving crew.

Fort Niagara life saving station, at the mouth of the Niagara river, will be opened for active work on or before Nov. 1. Capt. Briesser, formerly of the Marblehead station, Lake Erie, will be the keeper.

The new revenue cutter, Calumet, designed for harbor service at Chicago, was launched at Buffalo Saturday. The boat is nearly completed, and will probably be ready for service before the close of navigation.

At the American Steel Barge Company's yard, West Superior, only one vessel, No. 135, a steamer, is on the stocks. She will be in frame within a few days, and then work will, it is said, be suspended until after the holidays.

Two canal boats of Buffalo, the Rice and Lyman & Willie, both of 103.21 tons gross and 99.62 net, were assigned official numbers last week by the bureau of navigation. The Rice is numbered 56,609 and the Lyman & Willie 48,606.

Mr. Robert Logan, naval architect, late of Owen Sound, Ont., has taken up a residence in Cleveland. He had a hand in the building of the Canadian Pacific steamer Manitoba and also the cutters Curlew and Petrel, built at Owen Sound recently for the Canadian government.

During Sunday and Monday last, forty-seven vessels entered Buffalo harbor. Receipts reported by custom house officers for the two days were 2,314,000 bushels of grain and flaxseed, 53,000 barrels of flour and 3,300,000 feet of lumber, besides a large amount of general merchandise.

During last week the American Shipmasters' Association of New York classed the barks Auburndale and Charles F. Ward, three-masted schooner Nettie Champion and screw steamer City of Dallas, all American; also the British schooner Fred E. Cox and British bark Ruth Palmer.

A crew of nine men were lost last fall by the foundering of the schooner J. C. Finney below Port Colborne on Lake Erie. Not a single body was ever recovered from the wreck. Now the schooner C. B. Benson has been lost with all hands in the same locality and there is little hope of finding the bodies.

Mr. E. Platt Stratton, chief surveyor for the American Shipmasters' Association of New York, publishers of the Record of of American and Foreign Shipping, was in Cleveland last week to examine the steamer Merida, upon completion of extensive repairs necessitated by stranding in the St. Mary's river.

Trade Notes.

Thomas Sully, architect of New Orleans, La., has ordered from the Berlin Iron Bridge Company of East Berlin, Conn., an iron roof for a sugar house at Tampa, Fla. The building will be 60 feet in width and 125 feet in length, the trusses being entirely of iron covered with corrugated iron.

Judges appointed by officials at the world's fair at Chicago have made awards to the Joseph Dixon Crucible Company, Jersey City, N. J., for superior products in graphite, lead pencils, plumbago, crucibles, black-lead stoppers and nozzles, dippers, bowls, foundry facings and lubricating graphite. The Dixon company is known throughout the world as the pioneer in the graphite industry. The United States government in its bids for supplies says, "Dixon's or equal."

In a recent issue attention was called to the handsome exhibit of Penberthy injectors in machinery hall at the Columbian exposition, and it is now learned that the judges have awarded to this celebrated injector a medal for merit. During the six and a half years this injector has been on the market, nearly 75,000 have been placed on boilers all over the world, and everywhere they are used, they have given perfect satisfaction. They are manufacturad by the Penberthy Injector Company of Detroit, Mich.

The launch Daimler, built by the Daimler Motor Company of No. 111 East 14th street, New York city, has distinguished itself in the way of valuable practical service, besides affording one of the attractions of the World's Columbian Exposition. Six men sailing in a small yawl, about half a mile out in the lake, were capsized by a sudden gust of wind, and some of them at least, would have been drowned, had it not been for the rapidity with which the launch reached and rescued them. On another occasion the launch had the honor of going out and towing in the Viking ship, when the latter was unable to make port on account of head winds.

Heavy Loss on Government Harbor Work—Buffalo Matters.

BUFFALO, N. Y., Oct. 26.—The fact that one of the heaviest pecuniary losses sustained by the late storm was on the Buffalo breakwater work, has been passed over with a mere mention, but it involves some rather unpleasant questions. The damage must be nearly if not more than $100,000, for all of one 800-foot section, that of Contractor Donelly of this city, and all of a half-finished 800-foot section, that of Contractor Farnworth of Lockport, are washed out and destroyed. The 800-foot section of Contractor Churchyard, just finished, was protected somewhat by one of the others and is unharmed. This was by far the largest government job ever undertaken here, if not on the lakes, as it is worth about $100 a foot. The cause of the collapse was quicksand, that was feared by the contractors, but declared by the government engineer not to be present. This very nicely lets out the contractors, but puts Maj. Ruffner in a rather hard place, as it obliges him to reccommend the payment of the work in full, which it is understood he has already done. There is reason to fear that the work will not be replaced very promptly.

Secretary Keep of the Lake Carriers' Association lately received a petition from Capt. Alex McDougall of Duluth opposing the construction of a bridge across St. Louis river until a commission of engineers had passed upon it. He forwarded it to the navy department, as requested and now receives reply that there are no plans on file with the department for such a work and that nothing can be done without an act of congress. He is advised further that the association can appear in case any bill comes up and make its wishes known. It seems to be settled that a bridge is to be built, but marine men wish to see as unobjectionable a structure as possible proposed. This they will not oppose.

The war department appreciates the importance of Duluth harbor, and will not approve anything that will seriously injure it. No plans can be approved by the department until a bridge has been authorized by Congress. Until the bridge is authorized and plans are filed with the department, no board of engineers can be appointed, for there is nothing for such a board to consider. Should any bridge be authorized by Congress and application be made for approval of plans, the plans will be referred to a board of engineers, as requested by the lake carriers.

Everything works in favor of the Erie canal, which is making large profits this season. Now a grain blockade is upon us, on account of the railroads being tied up with passenger business, and the canal is doing all it can at its own rates.

British charts of Lake Superior cover the entire north shore. We have them for sale at $1.

WANTED---YACHT

Length on Deck	50 Feet.
Width	16 "
Depth	6 "
Draft not over	3 "

Give particulars as to age and rigging and lowest price.

12-19-26 Address MARINE REVIEW, 516 Perry-Payne Bldg, Cleveland, O.

FOR SALE CHEAP....

Two new Steel Scotch Marine Boilers, 12 ft. diameter, 11 ft. long, with Steam Drum, etc. Grate surface 61 feet. Sold for want of use Apply

THE HARLAN & HOLLINGSWORTH COMPANY,
WILMINGTON, DEL.

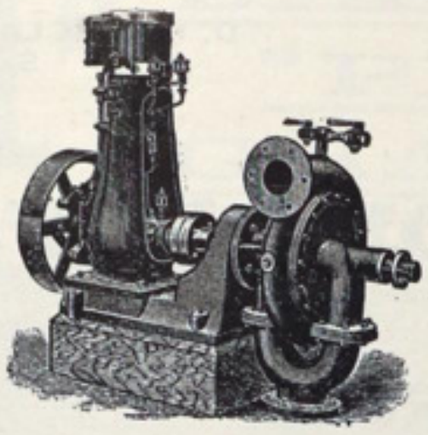
Nautical Steam Laundry

No. 100 RIVER STREET.

SPECIAL ATTENTION GIVEN TO MARINE WORK.

OPEN DAY AND NIGHT.
Telephone 2558 CHARLES M. SWARTWOOD, Proprietor.

Centrifugal Pumping Machinery



MANUFACTURED BY **LAWRENCE MACHINE CO.**

Adapted to requirements of contractors, wreckers, pumping out docks, cofferdams, and water bottoms of steel vessels.
Address for catalogue and prices,

R. H. ALDRICH, Engineer,
43 Builders' Exchange, BUFFALO, N. Y.

E. S. Richardson Fueling Co.

COAL

DOCKS
FOOT NO. MARKET ST
18TH ST. BRIDGE,
ILLINOIS CENTRAL SLIP "C"

OFFICE. 54 LA SALLE ST.
CHICAGO ILL.

MARINE VALVE OIL

For Cylinder Lubrication is unsurpassed, and is used in 90 per cent. of the large steamers on the great chain of lakes.

STANDARD OIL COMPANY, MARINE VALVE OIL CLEVELAND, O.

Marine Valve, Renown Engine, Eldorado Engine, Crank Case, Artic Cup Greases, Victor Signal, Dark Lubricating, and Lard Oils. Mineral Seal, Head Light,

— CARRIED IN STOCK AT THE —

Standard Oil Company's Marine Depot.

123 River Street, CLEVELAND, O.

TELEPHONE 77. MAIN OFFICE TELEPHONE 682.

ALSO FOR SALE BY

STANDARD OIL COMPANY,

No. 5 Wabash Ave., Chicago, Ill.
Racine, Wis.
Broadway & Mason, Milwaukee, Wis.
Sheboygan, Wis.
Manitowoc, Wis.
Green Bay, Wis.
Marinette, Wis.
Oshkosh, Wis,
Duluth, Minn,
West Superior, Wis.
Hancock, Mich.
Marquette, Mich.
Sault Ste. Marie, Mich.
Michigan Central Railway & 10th St., West Bay City, Mich.
Eighth & Sears Sts., Saginaw, Mich.
46 Jefferson. Detroit, Mich.
Summit & Monroe Sts, Toledo, O.

STANDARD OIL COMPANY, RENOWN ENGINE OIL CLEVELAND, OHIO.

ATLANTIC REFINING COMPANY, French & 16th Sts., Erie, Pa.
D. ROBESON, Port Huron, Mich.
W. S. MCKINNON, Ashtabula Harbor, O.
HULL & RAND, Huron, O.
STANDARD OIL COMPANY, Star Oil Works, Buffalo. N.Y.
BABY & DALE, St. Clair, Mich.
N. C. ALTEN, Lorain, O.
A. F. HARRINGTON, Conneaut Harbor, O.
A. H. MCGONAGIL, South Chicago, Ill.
MARINE SUPPLY CO., Fairport, O.
F. KRANZ, Sandusky, O.
THE M. I. WILCOX CORDAGE & SUPPLY CO., Toledo, O.

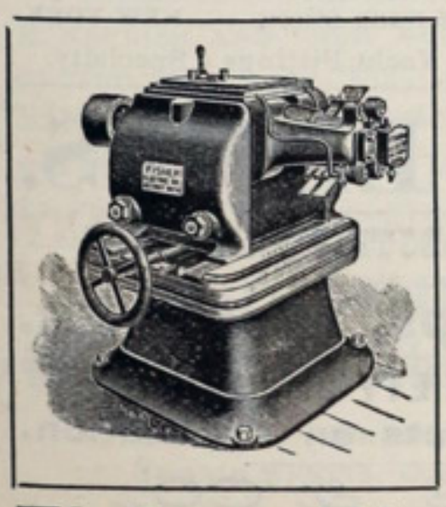
F. W. WHEELER, President.
E. T. CARRINGTON, Vice-President.
F. L. GILBERT, Secretary.

F. W. WHEELER & CO.,

WEST BAY CITY, MICH.

Builders of all kinds of METAL AND WOODEN SHIPS.

THE following Passenger Steamers employed at the **WORLD'S FAIR** are equipped with our Lighting Plants: We invite our friends and prospective customers to make an inspection of these Plants:



CHRISTOPHER COLUMBUS—Two 400 light direct-connected twin compound engines and dynamos with 800 lamps and search light.

ARTHUR ORR—Two direct-connected engines and automatic dynamos, 350 lamps.

CITY OF TOLEDO—Automatic belted engines and dynamo, 210 lights.

Fisher Electric Co. 183, 185 & 187 Larned Street, West, **Detroit, Mich.**

WILLIAM L. BROWN, President. W. F. COBB, Vice-President. W. I. BABCOCK, Manager. O. R. SINCLAIR, Secretary.

CHICAGO SHIP BUILDING COMPANY,

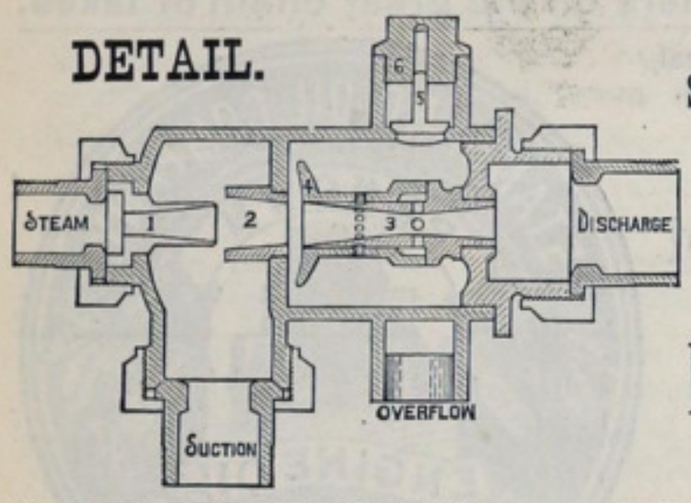
LONG DISTANCE TELEPHONES.
Ship Yard Office, "South Chicago 40."
Chicago Office, 1013 Rookery, "Main 3447."

STEEL STEAM-SHIP BUILDERS,

101st St. and Calumet River, SOUTH CHICAGO, ILL.

The Globe Automatic Injector.

DETAIL.



See the SIMPLICITY OF IT!

SUPERIOR FOR MARINE BOILERS.

Write for Particulars.

Eagle Lubricator Co.

MANUFACTURERS,

108 Canal St., - Cleveland, O.

THE "CINCINNATI"

AUTOMATIC

STEAM STEERING GEAR

A Simple, Powerful Machine. Noiseless and Sure.

SEND FOR CIRCULAR.

CRAWLEY & JOHNSTON,
119-121-125 E. Pearl St., CINCINNATI, OHIO.

GEORGE B. CARPENTER. ESTABLISHED 1840. BENJAMIN CARPENTER.

GEO. B. CARPENTER & CO.

Ship Chandlers and Sail Makers.

CORDAGE, TWINES, COTTON DUCK,
MILL, RAILROAD and VESSEL SUPPLIES.

202, 204, 206, 208 So. WATER STREET,
CHICAGO, ILL.

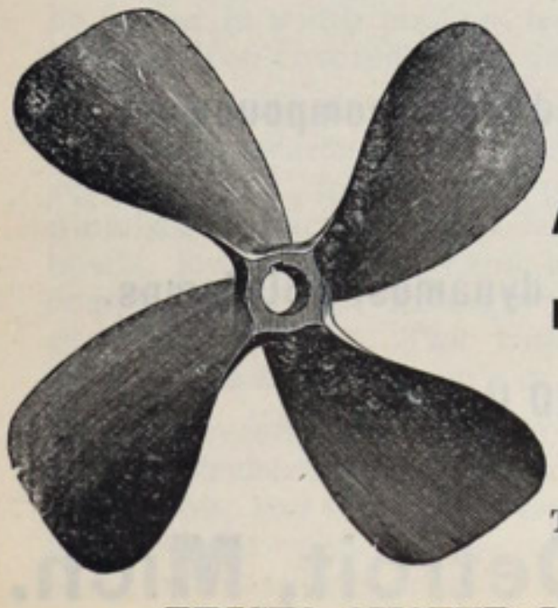
H. G. TROUT

KING IRON WORKS,

BUFFALO, N. Y.,

MANUFACTURERS OF

TRIPLE EXPANSION, THREE CYLINDER, FORE AND AFT And STEEPLE COMPOUND MARINE ENGINES,



High and Low Pressure Engines, Sectional, Propeller. Tug and Yacht Wheels.

Cowles Aluminum and Manganese Bronze Propeller Wheels.

These Wheels are noted for their extra speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.

THE JENKS SHIP BUILDING CO.

Will have FOR SALE OR CHARTER by the begining of navigation, 1893,

THREE (3) STEAMERS

Especially Designed for the Lumber Trade.

If interested, address them at PORT HURON, MICH.

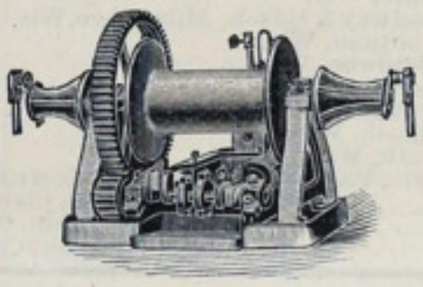
C. H. McCUTCHEON,

(Successor to SAMUEL McCUTCHEON.)

Copper, Tin and Sheet Iron Manufactory,
Steamboat and Engineers' Supplies.

All kinds of Brass Cocks, Globe Valves and Couplings, &c. Iron Pipe and Fittings, and Mill Supplies. Rubber Belting, Hose and Packings, Springs, Valves, &c., Leather Belting and Usudurian Packing.

Telephone No. 68. No. 18 Ohio Street BUFFALO, N. Y.



JACKSON & CHURCH,

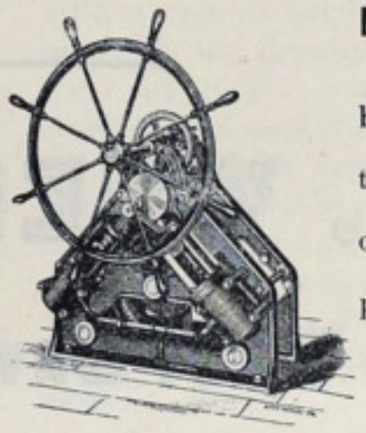
Builders of DUPLEX HOISTING and DECK ENGINES.

Plain Finished and Automatic ENGINES, From Heavy Patterns at Moderate Prices.

Vertical, Horizontal, Marine & Locomotive BOILERS Strictly First-Class and Highest Test.

Send for Circulars and Prices. SAGINAW, MICH.

SHERIFFS STEAM STEERER.



MADE IN TWO SIZES.

Are easy to adjust and can be handled by any one.

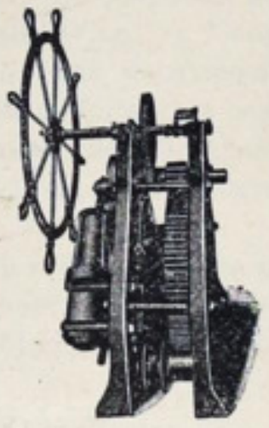
The Steerer can be arranged to set in pilot house or aft.

No Steerer will be sold without a quadrant.

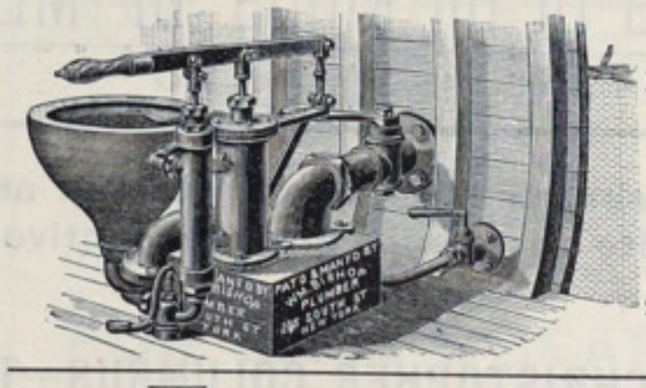
Steerer will be sold on approval.

Manufactured by

SHERIFFS MFG. CO.,
126-130 Barclay Street,
MILWAUKEE, WIS.



COMBINATION PUMP WATER CLOSET



For Yachts, Pilot Boats, Naval Ships, Etc.

For above or below water line. No tank needed, and when below water line you can flush bowl without having to use pump.

WILLIAM BISHOP,
Plumber, Coppersmith & Steam Fitter,
Telephone 4811 Cortlandt,
205 South Street, NEW YORK.

Yacht Fittings a Specialty.

SHIP LAMPS.

OIL AND ELECTRIC FIXTURERS

FOR

Steamships, Yachts, &c.

GREAT VARIETY OF DESIGNS.

Prices and Cuts on Application.

PAGE BROS. & CO.,

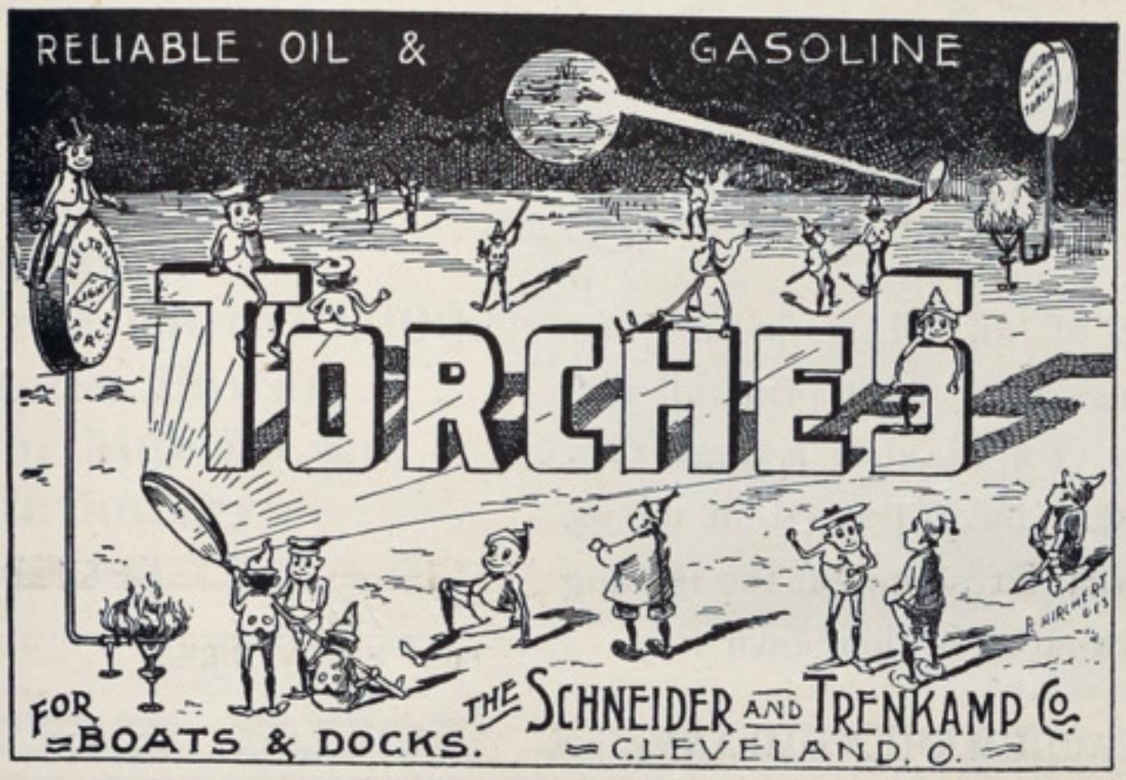
(Formerly WILLIAMS, PAGE & CO.)

227 to 233 Cambridge St., BOSTON, MASS.

"PL" DIXON'S "PL" GRAPHITE.

Dixon's Perfect Lubricating Graphite is indispensible to every engineer and machinst. It can be used dry or mixed with water, oil or grease. We send free of charge a sample and pamphlet with interesting and instructive information.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.



Photographs and Drawings reproduced for all kinds of Printing.

Cleveland, O.

1880. 1893

CHAS. H. POTTER & CO.,

Investment Bankers,

Cleveland, O.

Dealers in

Lake Superior Iron Mining Stocks,

on about 10 per cent. annual dividend basis, Republic Iron Co., Lake Superior Iron Co., Champion Iron Co., Minnesota Iron Co., Jackson Iron Co., Cleveland-Cliffs Iron Co., Chandler Iron Co., Chicago and Minnesota Ore Co.

CONNELLY BROS. & CO.

OHIO, Cor. Michigan St., BUFFALO, N. Y.

SHIP CHANDLERY, PAINTS, OILS,

AND VESSEL SUPPLIES.

ST. MARY'S RIVER CHARTS NOS. 1 AND 2 FROM POINT IROQUOIS TO E. NEEBISH AND FROM MUD LAKE ENTRANCE TO E. NEEBISH, CORRECTED TO AUG. 30, 1892, CAN BE HAD AT THE OFFICE OF THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, FOR 20 CENTS EACH, OR BOTH BY MAIL FOR 50 CENTS. BOTH CHARTS WILL BE FURNISHED WITH CLOTH BACKS AND BOUND EDGES FOR $1.50.

H. CHANNON COMPANY,

General Ship Chandlers and Sail Makers,

Dealers in Manilla Rope, Wire Rope,
Tackle Blocks, Cotton Duck, Anchors, Chains, Etc.

24-26 MARKET STREET, CHICAGO, ILL.

AMERICAN CHAIN CABLE WORKS.

ESTABLISHED 1865.

Cable, Dredge, Quarry, Shipping, Crane and Rafting

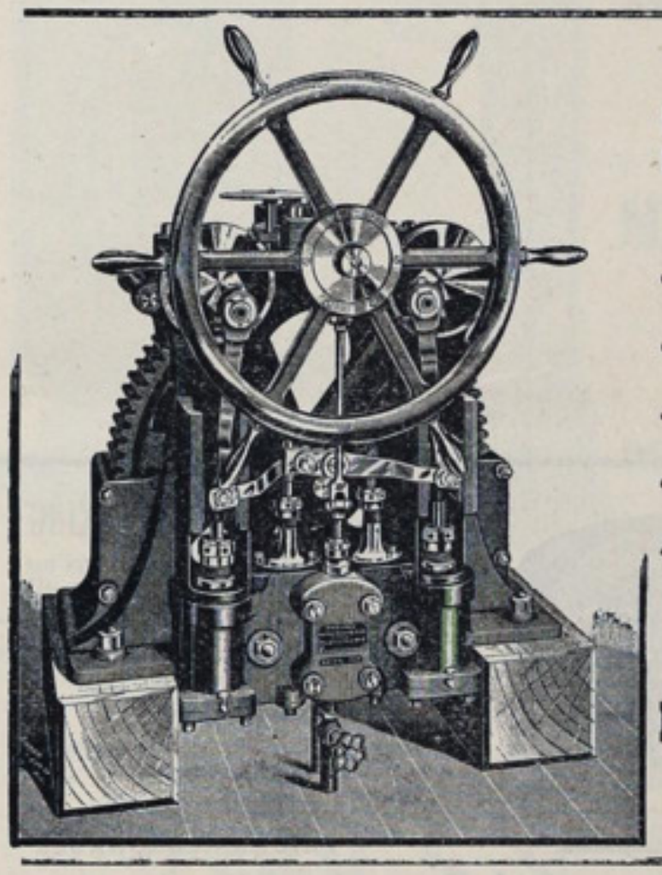
CHAINS.

Our DREDGE and CRANE CHAINS are made of IRON ROLLED SPECIALLY for that purpose. Send for Price List.

J. B. CARR & CO., Manufacturers, TROY, NEW YORK.

THOS. DREIN & SON, TATNALL AND RAILROAD STS., WILMINGTON, DEL.

Builders of Metallic Life Boats and Rafts, Yachts and Pleasure Boats, Life Preservers. Outfit for Lake Steamers a Specialty.



No. 4 BECK
Steam Steering Gear.

Extracts from Letters.

"THE steering gears of the lakes."
Capt. Higgie, V. O. T. Co., Chicago.

"Cannot be excelled."
Capt. Cochran, Steamer Marion.

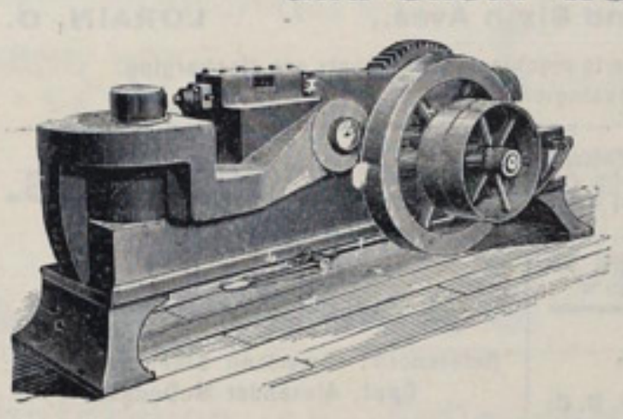
"Gives entire satisfaction."
Independent Tug Line, Chicago.

"Are giving excellent satisfaction."
Milwaukee Dredge Co.

"The No. 4 Beck Steering Gear put in our steamer, Samuel Mather, has given excellent satisfaction."
W. L. Mahon, Mech'l Eng'r, American Steel Barge Co.

PAWLING & HARNISCHFEGER,
156-168 Clinton Street,
MILWAUKEE, WIS.

The Excelsior Machine and Cleveland Punch and Shear Works Co.



SUCCESSORS TO
LEICHTON & HATHAWAY.
Manufacturers of

Punches, Shears, Bending Rolls, Rotary Planers, Overhead & Post Drill Presses.

980 to 986 Hamilton St.,
CLEVELAND, OHIO.

MARINE REVIEW LINER EXCHANGE.

Space under this heading may be used gratis by our advertisers or subscribers to call attention to vessels or any craft, machinery, new or second hand, that they may have for sale. Those wanting machinery of any kind or wishing to purchase vessels, are invited to take advantage of the same offer. Employers in need of professional men or men who want positions may avail themselves of the opportunities offered. Each item will be limited to three lines. Letters concerning same must mention number attached to item and be addressed MARINE REVIEW, 516 Perry-Payne Building, Cleveland, O.

217—FOR SALE—Dredge Erie, two dumping scows, one float scow, two Ingersoll-Sargent rock drills etc.

219—FOR SALE CHEAP—Punch with 60-inch throat, and one engine driven with 18-inch throat.

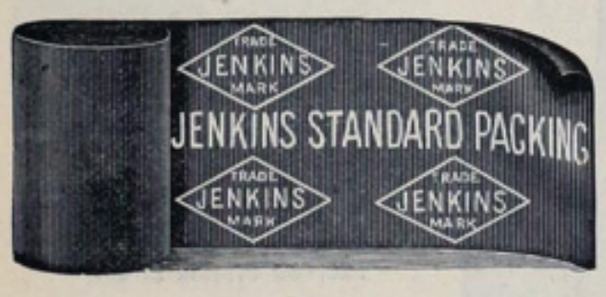
220—Plate straightening rolls and a combined punch and shear with 25-inch throat for sale at a bargain.

The Proof of the Pudding

is in the eating. The test of an oil is in its use. Engineers are the best judges. We can't print all that marine engineers say of VACUUM MARINE ENGINE OIL. Letters from enthusiastic users have poured in on us. Just watch this space and we'll let some of the leading marine engineers tell their own story in their own way.

VACUUM OIL COMPANY,
Rochester, N. Y.

In stock at the leading ports.



JENKINS STANDARD PACKING

For Steam or Joint Packing has no superior. It is manufactured in all thicknesses. It is not LOADED to increase weight. Does n t ROT or BURN OUT. Every sheet is stamped with Trade Mark, like cut.

JENKINS BROS.,
New York, Philadelphia,
Boston and Chicago.

MARINE WORK A SPECIALTY. PRICES REASONABLE

Lorain Machine and Repair Shop,

ED. A. FULLER, PROPRIETOR,
Broadway, between Fifth and Sixth Aves., - LORAIN, O.

Shop well equipped for repairs to machinery while boats are discharging and taking on cargoes.

"ALL HANDS AFT."

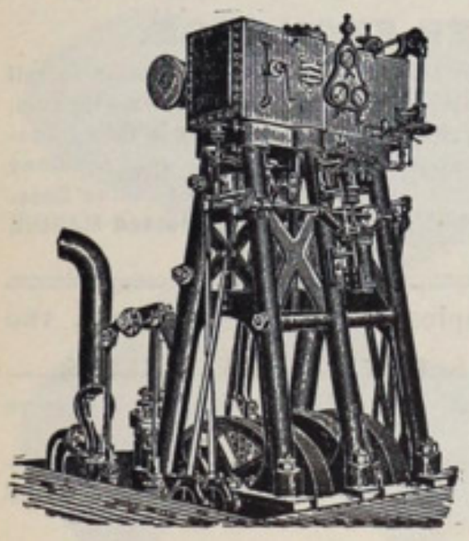
Let me get your Patent, Trade Mark, or Claim for you. Honest and Good work is my pride.

EDWARD C. WEAVER, Atty.,
900 F. (opp. Patent Office), WASHNGTON, D. C.

PATENTS.

FRANK L. DYER,
918 F. Street,
Washington, D. C.

References: American Steel Barge Co.; Capt. Alexander McDougall.



J. D. WILSON. M. HENDRIE

MONTAGUE IRON WORKS,

MONTAGUE, MICH.

WILSON & HENDRIE, Proprietors.

MANUFACTURERS OF

MARINE :: ENGINES :: AND :: BOILERS,

and General Mill Machinery.

P. M. CHURCH & CO.,

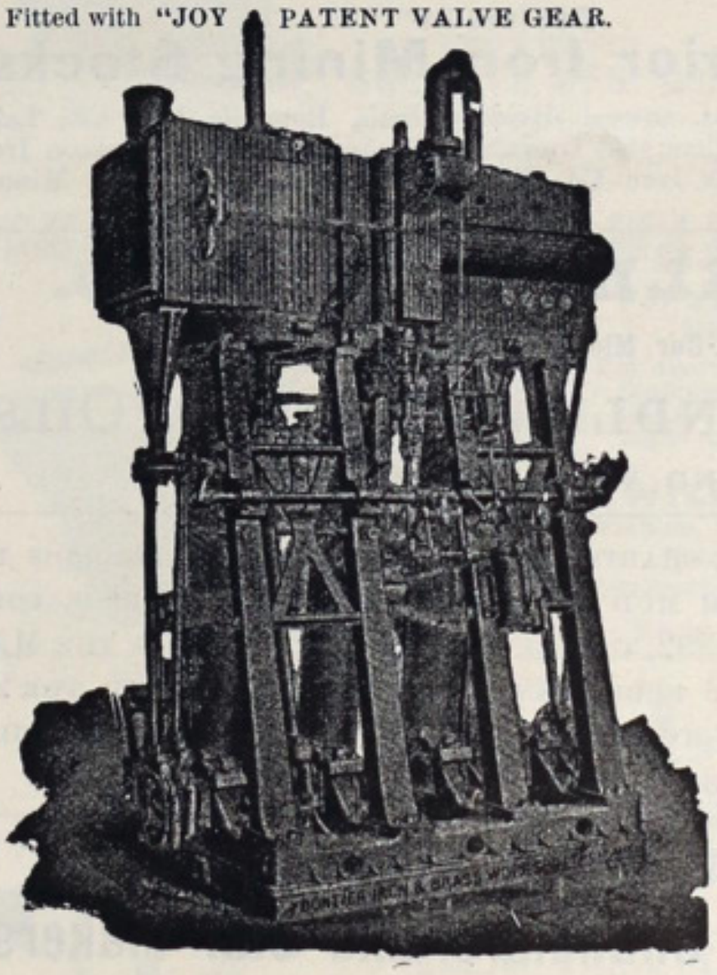
SAVINGS BANK BLOCK, SAULT STE. MARIE, MICH.
LEADING DEALERS IN

Ship Chandlery,

Marine Hardware, Paints, Oils, Packings, Cordage, Etc.
FIRST-CLASS COPPERSMITH AND TINSHOP IN CONNECTION.

THE FRONTIER IRON WORKS.

Fitted with "JOY" PATENT VALVE GEAR.



DETROIT, MICH.,
Builders of
TRIPLE EXPANSION
and all kinds of
Marine Engines

Engines furnished for Steamships:

T. W. Palmer, Livingstone, Majestic, Tampa, John Mitchell, Nyanza, Fedora, Geo. F. Williams, Mackinaw, Keweenaw, Jno. Harper, W. F. Sauber and Iosco. Panther, (fore and compound). Uganda, W. H. Gilbert, C. F. Bielman.

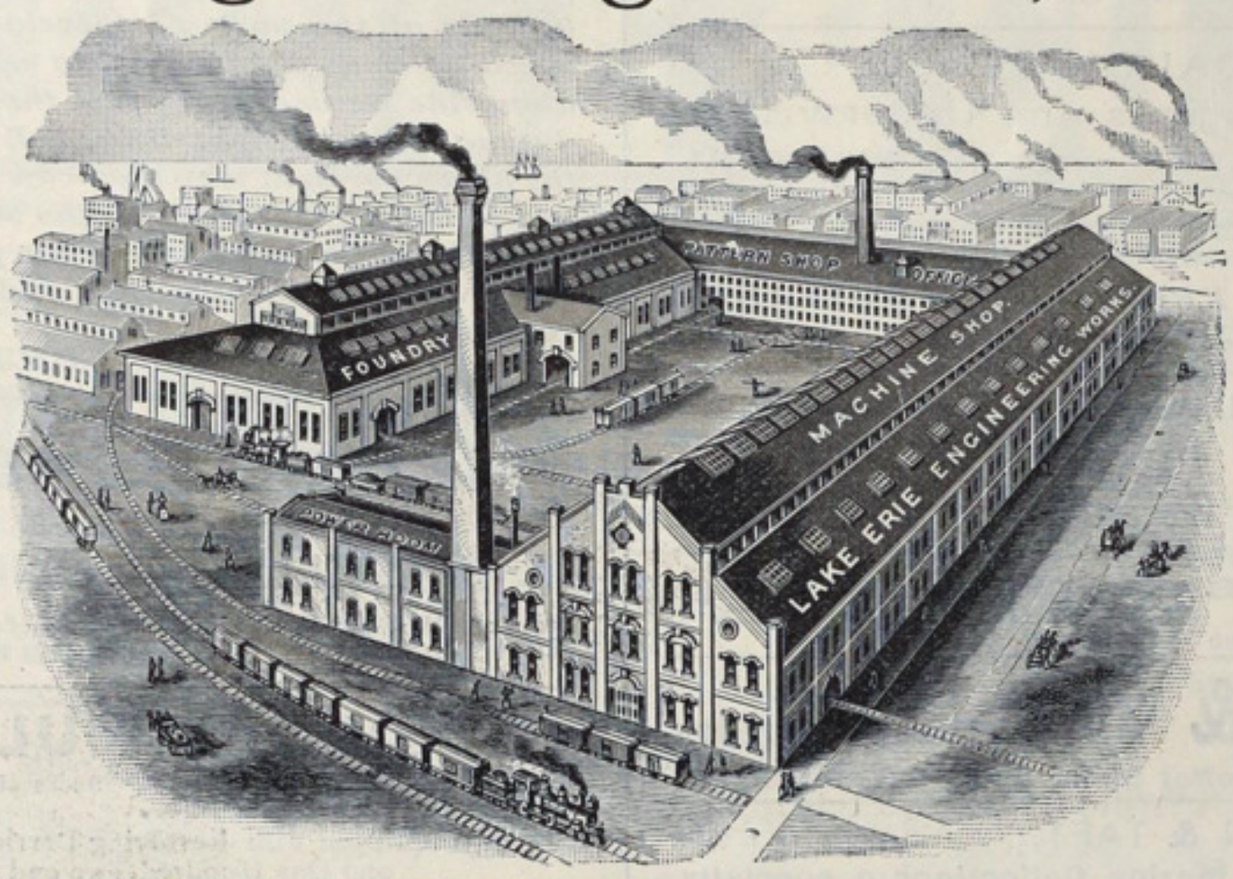
WHALEBACKS—
Samuel Mather, Pathfinder.

CORRECTED CHARTS OF THE ST. MARY'S RIVER CAN BE HAD FROM THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O.

Lake Erie Engineering Works, Buffalo, N. Y.

RICHARD HAMMOND, Pres't. JOHN COON, Sec'y and Treas.

Steam Engines, Compound, Triple and Quadruple Expansion Engines, From 250 to 10,000 Horse Power For Marine and Stationary Service.



Special Designs for Cable Railways and Electric Power Plants.

The Best Economy and Regulation Guaranteed.

THE BEST EQUIPPED PLANT IN AMERICA.

The Chase Machine Co.

111 ELM ST., CLEVELAND, O.,

...MACHINISTS AND ENGINEERS...

MANUFACTURERS OF

LAND AND MARINE ENGINES and STEAM PUMPS,

SOLE OWNERS AND MANUFACTURERS OF

Chase Fog Whistle Machine.

Over 150 in use on the best class of Lake Steamers.

Special Attention given to Marine Repair Work.

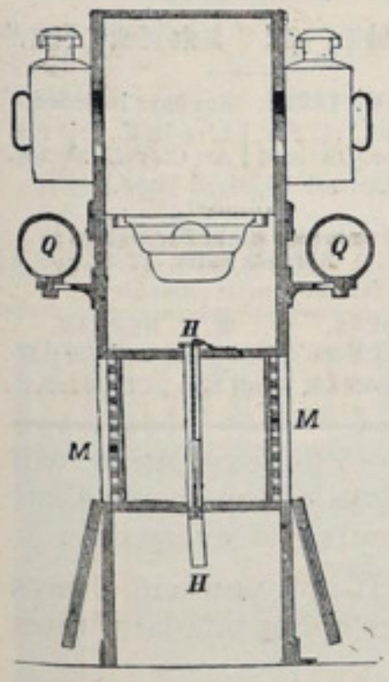
ENGINEERS' SUPPLIES.

ASBESTOS PIPE AND BOILER COVERING. TELEPHONE 994.

PATENT ADJUSTABLE

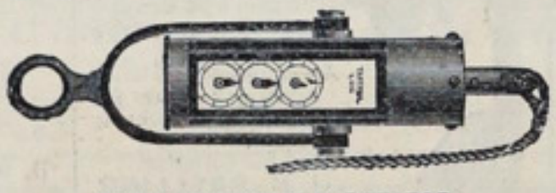
BINNACLE and COMPASS

FOR PILOT HOUSES.



With Directions for Adjustment.
SEND FOR CIRCULAR.

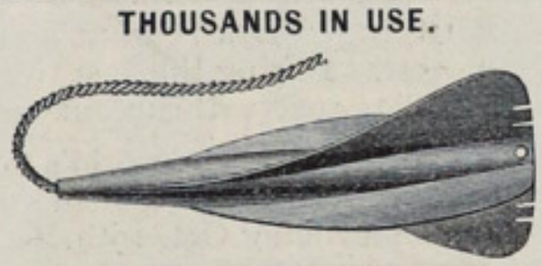
..TAFFRAIL LOG..



WITH ADJUSTABLE ROTATOR.

BEST LOG IN THE MARKET.

THOUSANDS IN USE.

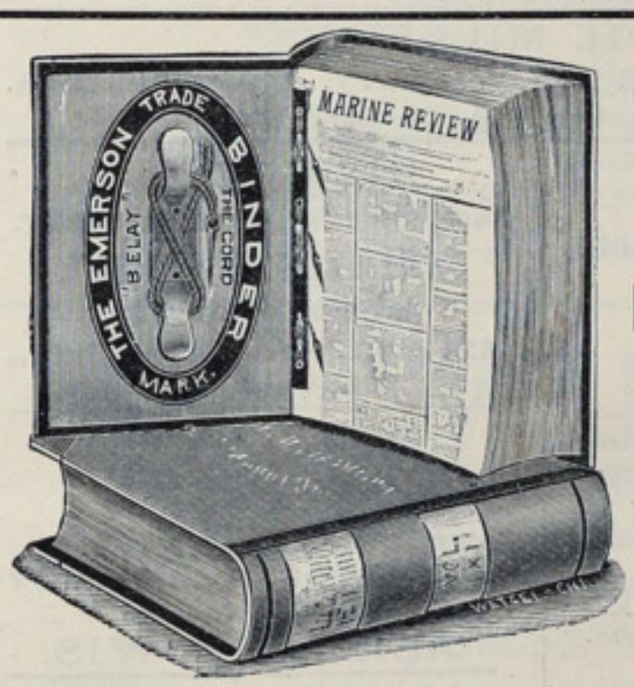


MANUFACTURED BY

JOHN BLISS & CO., 128 Front Street, NEW YORK.

☞SEND YOUR ORDER FOR "PATTERSON'S NAUTICAL DICTIONARY" ($5) TO THE "MARINE REVIEW" AT ONCE.

PHOTOTYPES OF THE NEW NORTHERN STEAMERS, THE CHRISTOPHER COLUMBUS, THE S. S. CURRY AND TWELVE OTHERS, INCLUDING A PICTURE OF THE GREAT EASTERN, SENT TO ANY ADDRESS ON RECEIPT OF 50 CENTS BY THE MARINE REVIEW, NO. 516 PERRY-PAYNE BUILDING, CLEVELAND, O.



ONE OF THESE BINDERS

that will hold 52 NUMBERS of the

MARINE REVIEW,

Will be mailed to any address on receipt of $1.

MARINE REVIEW...

516 Perry-Payne Bldg., CLEVELAND, O.

STARRETT'S TOOLS ARE WARRANTED

SEND FOR CATALOGUE

L. S. STARRETT

ATHOL, MASS.

Naval Architects, Marine Engineers, Shipbuilders And Engine Builders,

NOTICE!

The MARINE REVIEW, Cleveland, O, has arranged to furnish you the 1,500 Pages of Proceedings and Papers with Engravings of the International Engineering Congress, recently held in Chicago, for $10

Phototypes of the Following Lake Steamers:

(NEATLY BOUND, 7 x 10 INCHES.)

North America, Christopher Columbus, S. S. Curry, Minnesota Fleet, Tuscarora, Sainte Marie, Chemung. Schuylkill, E. C. Pope, Pontiac, Western Reserve, Virginia, Twelve Representative Steamers, and the Great Eastern, with an eight colored lithograph of the WORLD'S FAIR WAR SHIP,

WILL BE MAILED TO ANY ADDRESS ON RECEIPT OF FIFTY CENTS.

MARINE REVIEW, 516 Perry-Payne Bldg.,

CLEVELAND, OHIO.

HARVEY D. GOULDER,
LAWYER AND PROCTOR IN ADMIRALTY,
CLEVELAND, O.

W. H. COOK.
CAPT. J. A. CALBICK.
J. B. CLOUGH.

COOK, CALBICK & CO.
Vessel Agents and Underwriters.

Tel., Main, 56. RIALTO BLDG., No. 23 Sherman St., CHICAGO, ILL.

H. R. SPENCER,
ATTORNEY AT LAW and PROCTOR IN ADMIRALTY.
218 Superior St., DULUTH, MINN.

C. E. KREMER, *Attorney and Counselor-at-Law and Proctorin Admiralty.*
Rooms 14, 15 and 16, Bryan Block, - - 164 La Salle St., CHICAGO, ILL.

JOHN MITCHELL. JOHN F. WEDOW. ALFRED MITCHELL.

MITCHELL & CO.,
Vessel and Insurance Agents,
508, 509 and 510 Perry-Payne Building, CLEVELAND, OHIO.
Office Telephone, 737. Reidence, John Mitchell, 3506.

WM. A. MOORE.
WM. V. MOORE.
JOHN H. GOFF.

MOORES & GOFF, Proctors in Admiralty
Telephone 2565. 60-61 Moffat Block, DETROIT, MICH.

H. C. MASON. MASON & TAFT, F. L. TAFT.
ATTORNEYS-AT-LAW, Marine Collections a specialty.
218 Society for Savings Bldg., Cleveland, O.
TELEPHONE 876.

WM. H. MILLER,
ATTORNEY AND PROCTOR IN ADMIRALTY. Marine Collections.
626 Society for Savings Bldg., Cleveland, Ohio.

JOHN PRINDIVILLE,
Vessel and Insurance Agent,
12 Sherman Street,
CHICAGO, ILL.
Telephone, Main, 129.

C. A. Macdonald. J. J. Rardon.
C. A. MACDONALD & CO.
General Insurance Agents,
RIALTO BUILDING, CHICAGO, ILL

H. S. LORD. J. H. NORTON.
LORD & NORTON,
Attorneys-at-Law, Proctors and Advocates in Admiralty,
DULUTH, MINN.

White, Johnson & McCaslin,
ATTORNEYS-AT-LAW,
—AND—
Proctors in Admiralty,
26-27 Blackstone Building,
CLEVELAND, - OHIO.

THOS. WILSON,
MANAGING OWNER
WILSON'S TRANSIT LINE.
Gen. Forwarder.
Freight and Vessel Agent.
CLEVELAND, O.

C. F. Palmer. Chas. Hutchinson.
P. J. Minch.
PALMER & CO.,
Vessel Owners and Agents,
(John H. Palmer and Jonn T. Hutchinson, Associates.)
Perry-Payne Bldg., Cleveland, O.

W. A. HAWGOOD. C. C. CANFIELD.
HAWGOOD & CANFIELD,
Vessel Agents and Marine Insurance,
604-605 Perry-Payne Bldg.,
Cleveland, - Ohio.
Telephone No. 2395.

Capt. LYMAN HUNT. JAMES P. HUNT.
L. HUNT & SON,
Vessel Brokerage & Marine Insurance,
Room 9, Exchange Building.
Telephone No. 522.
No. 202 Main St., BUFFALO, N.Y.

Law Offices.
Notary Public and Stenographer.
ORESTES C. PINNEY,
Proctor in Admiralty,
521 & 522 Perry-Payne Bldg.,
CLEVELAND, O.

W. L. Windom.
ATTORNEY-AT-LAW AND PROCTOR IN ADMIRALTY
Marine Notary.
ASHLAND, WIS.

C. W. ELPHICKE. A. L. FITCH.
JAS. A. MYERS.
C. W. ELPHICKE & CO.,
Vessel Owners and Agents,
Marine Underwriters,
Rooms 10, 11 and 12, Wheeler Block. 6 and 8 Sherman St. CHICAGO.
Telephone 1194.

E. T. HITCHCOCK,
Average Adjuster,
184 Main St.,
BUFFALO, N.Y.

Moore, Bartow & Gilchrist,
Ship Brokers & Agents,
Nos. 611 & 612 Perry-Payne Building,
Superior Street. Cleveland, O.

H. J. WEBB & CO.
SHIP BROKERS, VESSEL OWNERS and AGENTS,
Established in 1856. H. J. Webb & Co. will charter vessels for the lake trade. Special attention given to chartering vessels in the Lake Superior Iron Ore trade, both for the season and single trip.
☞No. 606 & 607 Perry-Payne Building, Cleveland, O. Office Telephone No. 338, Residence No 3228.

J. T. ROSE. FRANK B. LAZIER.
ROSE & LAZIER,
Vessel Agents and Brokers, and Marine Insurance,
16 Board of Trade,
DULUTH, - - MINN.

Established 1857.
THOMAS MARKS & CO.,
Merchants,
Forwarders and Shipowners,
Port Arthur, Canada.
N. B.—Special attention given to chartering vessels.

To Owners and Masters of Steam Barges.

—:o:—

We beg to call your attention to the fact that we have steam lighters at the ports of Cleveland, Ashtabula and Buffalo, specially equipped for fueling vessels, which enable us to run alongside steamers and fuel them while they are unloading during day or night time. We also have fueling docks at the above ports, at which we can take care of vessels not desiring to avail themselves of the services of the steam lighters. We shall in the future, as in the past, handle nothing but the best grade of Pittsburg coal, and respectfully solicit your patronage.

PICKANDS, MATHER & CO.

Mullen-Gatfield Coal Co.

— DEALERS IN THE CELEBRATED —

MANSFIELD AND YOUGHIOGHENY COALS.

Docks at SANDWICH, ONTARIO, opposite the Fort at Detroit, with chutes for rapid fueling.
Elevated docks and derrick at AMHERSTBURG, ONTARIO.

THE CUDDY-MULLEN COAL CO.,

Dealers in COAL. Docks at Government Pier, Whiskey Island, and Adjoining Globe Dry Dock.

All fully equipped with Revolving Derricks; also, Lighter Carrying Derrick and One Hundred Two and One-Half Ton Buckets.
Main Office, 81 Perkins Building, East Side of Main Street Bridge.
Dock Office, 127 West River St., Cleveland, O. Telephone No. 8.
Boats Coaled Day and Night. Docks at Amherstburg,

Ohio & Pennsylvania Coal Co.

FUEL DEPARTMENT.
MINERS AND SHIPPERS,

Youghiogheny and Ohio Steam Coals. Steamboats, Tugs, etc., Coaled day or night, Docks Foot West River Street. Whiskey Island Government Pier and C. & P. R. R. Slips. Also STEAM LIGHTER—Equipped with Revolving Derrick and (100) two ton buckets.

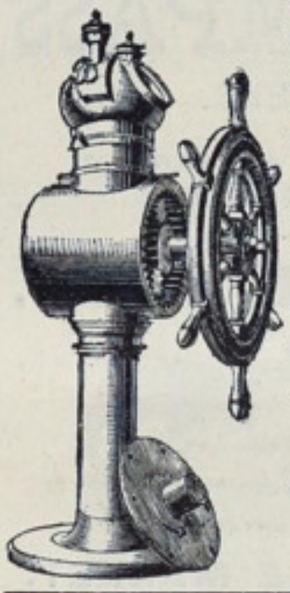
Telephone 1608. Office, 130 West River St., CLEVELAND, OHIO.

THE HUBBARD COAL CO.

S. B. HUBBARD, Manager.

WHOLESALE COAL. JACKSON OUR SPECIALTY. STEAMERS COALED.

Office with R. B. Hubbard & Son, Wholesale Lumber,
SANDUSKY, OHIO.



SNELLING'S PATENT STEERER

For Steamers, Ships, Tugs, Yachts, Coal Barges, Etc.
The drum has powerful internal gearing.
No Purchase Blocks needed.
Simple as the common "wheel and drum."
Powerful as any Screw Steerer.
An excellent relief or auxiliary gear for vessels that steer by steam.
Send for Circular.
J. H. SNELLING,
158 South Street,
NEW YORK.

"Cleveland to Buffalo while you sleep."

Cleveland & Buffalo Transit Co.

Magnificent Side Wheel Steel Steamers.
"State of Ohio," and "State of New York."

DAILY TIME TABLE. (Sundays included.)

L've Cleve., 7:15 P.M.	L've Buff., 7:45 P.M.
Ar. Buffalo, 7:30 A.M.	Ar. Cleve., 8:00 A.M.

(Central Standard Time.)

Special Saturday Night Excursions to Niagara Falls.
☞Write for our tourist pamphlet.
H. R. ROGERS, Gen'l Pass. Agt. W. F. HERMAN, Gen'l Agt.
T. F. NEWMAN, Gen'l Mgr, Cleveland.

THE LAST OF THE WORLD'S FAIR—The exposition will close Oct. 31st. During the last twelve days of the world's fair the Nickel Plate road will run one-fare excursions every day.

HAVE YOU SEEN—The world's fair? If not, you will always regret it. See Nickel Plate road's agents about one-fare rates every day commencing Oct. 19th.

H. A. BARR, President, Escanaba. F. H. VAN CLEVE, Sec. Escanaba. CAPT. GEO. BARTLEY, Supt Escanaba.

ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready.

TUG MONARCH,	Engine Compound, Cylinder 16 and 30 inches diameter, 30 inch. Stroke, Steam Pressure Allowed, 125 pounds.
TUG DELTA,	Cylinder 20 by 22, Steam Pressure Allowed, 105 pounds.
TUG OWEN,	Cylinder 20 by 20, Steam Pressure Allowed, 104 pounds.

CENTRIFUGAL PUMPS, Seven and Fourteen Inch Suction

MECHANICAL DRAWING Taught by Mail,

Also, Mechanics, *Mining, Prospecting, Arithmetic, etc.* To begin, students only need know how to read and write. DIPLOMAS Awarded. Low Prices. Send for Free Circular to The Correspondence School of Mechanics, Scranton, Pa

S. F. HODGE & CO.

MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.

320 ATWATER STREET,
DETROIT, MICH.

—THE—

Bethlehem Iron Company

PRINCIPAL OFFICE and WORKS:

SOUTH BETHLEHEM, PENNA.

Steel Rails, Open Hearth, Bessemer and Nickel Steel Billets and Forgings.

Hydraulic Forged Shafting, Hollow or Solid.
Cranks, Rolls, Etc.

Rough Machined or Finished. Fluid Compressed Steel.

GUNS and ARMOR.

New York Office,
80 Broadway.

Philadelphia Office,
421 Chestnut St.

LIFE-SAVING MATTRESSES.

THE ONLY MATTRESS made that is essential for steamship use; fitted with life-cords, each mattress becomes a LIFE PRESERVER and will hold up twenty persons in the water. They are also especially adapted for Steamships, Yachts, etc., as they are always pure and clean, never need renovating, will not absorb moisture and cannot become infected with the germs of any contagious disease. Furthermore, they make the most comfortable bed in existence. Be sure you have your new vessels fitted entire with our goods. Write for catalogue and testimonial letters.

IMPORTANT.—We have just received official notice from the U.S. Government, that ships having our AIR MATTRESSES can carry so many less Life Preservers. Manufactured and sold only by

METROPOLITAN AIR GOODS CO., 7 Temple Place, Boston, Mass.

HORACE SEE,

CONSULTING ENGINEER AND NAVAL ARCHITECT

ONE BROADWAY, NEW YORK.

THE CONDIT FULLER CO.

CLEVELAND, OHIO.

BAR IRON, SHEET IRON, PLATE IRON, PIG IRON,
BOILER TUBES, BOILER RIVETS, PLATE STEEL,
CLINCH RINGS, GAS PIPE, BOAT SPIKES, STEEL NAILS.

Sales Agents of
THE CARBON STEEL CO.
Manufacturers of
OPEN HEARTH STEEL,
SHIP PLATES, BOILER PLATES,
ARCHES and STRAPS FOR VESSELS A SPECIALTY.
Write for Prices and List of Sizes.

ALSO ADAPTED FOR
Iron and Steel Heating.

For Hull and Boiler Plates, Tubes, Bending, Straightening and Laying Up Work.

THE "WELLS LIGHT"

WALLWORK & WELLS' PATENTS.

2000 CANDLE POWER!

ESPECIALLY ADAPTED FOR

Dry Docks and Night Loading.

PORTABLE,
ENTIRELY SELF-CONTAINED,
REQUIRES NO OUTSIDE MOTIVE POWER,
UNAFFECTED BY WEATHER,
NO SPRAY, NO SMOKE, SAFE AND ECONOMICAL.
IN USE ON 15 DRY DOCKS ON THE LAKES.

For further particulars, address

WILLIAM HALPIN,

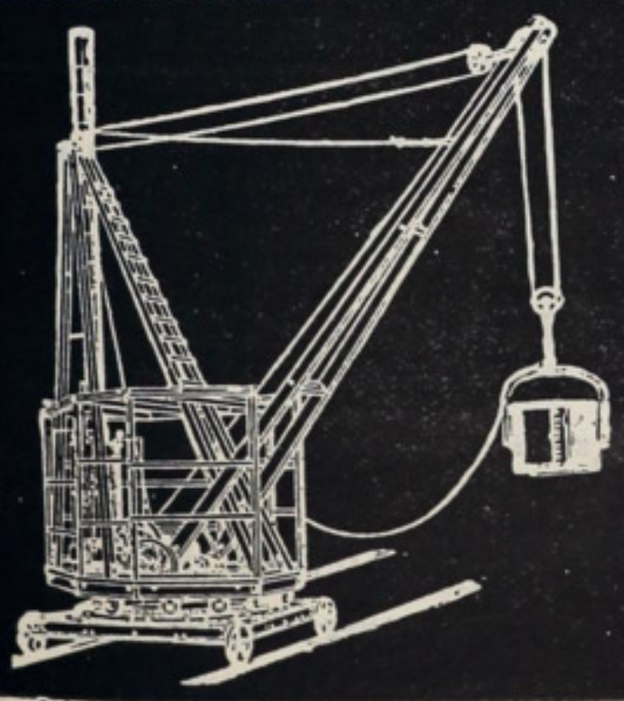
Successor to KEEGAN & HALPIN,

45 and 46 Washington St., NEW YORK.

McMYLER MANUFACTURING CO., 180 COLUMBUS STREET, CLEVELAND, O.

SOLE MAKERS OF THE

McMYLER PATENT REVOLVING STEAM DERRICK

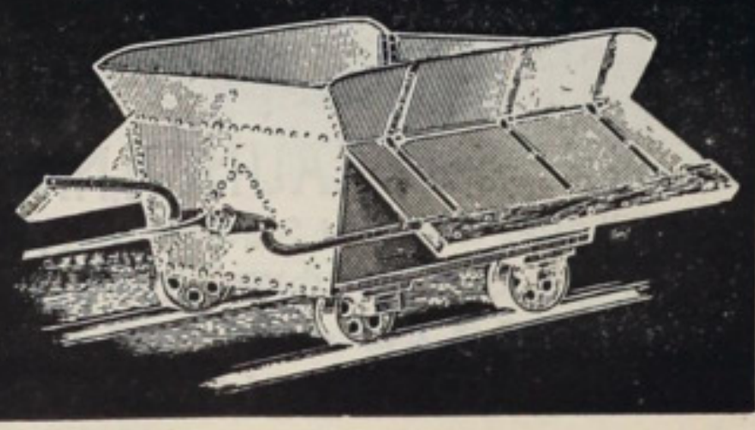


FOR HANDLING COAL, ORE AND COARSE FREIGHT OF ANY DESCRIPTION.

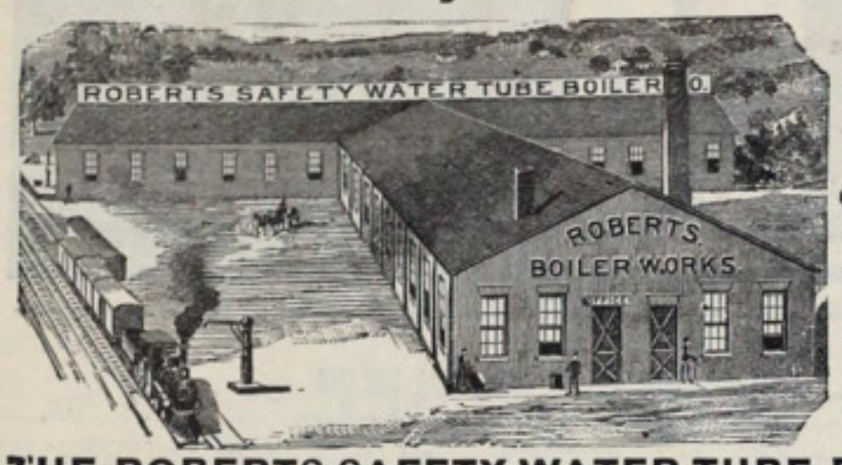
This Derrick can Lift Load, Alter the Radius of Boom, Swing in Either Direction at Will of Operator, and can Propel Itself on Track any Desired Distance.

BUILT FOR ANY CAPACITY WANTED

BUILDERS OF
CONVEYORS, COAL BUCKETS, ORE BUCKETS AND DUMP CARS.



The Roberts Safety Water Tube Marine Boiler



FOR
Yachts, Launches,
AND OTHER
Steamers.

OVER 500 IN USE.

Safe, Reliable, Simple, Light Weight, No Shop Repairs, Small Space. Send for illustrated pamphlet and other reading matter.

THE ROBERTS SAFETY WATER TUBE BOILER CO.
Works Covering 12,000 Square Feet of Ground at RED BANK, N. J.
18 Cortlandt Street, NEW YORK CITY.

DAVID WHITNEY, JR., President. THE F. H. WHITNEY, Secretary

MICHIGAN
Fire and Marine Insurance Company,
DETROIT, MICH.

CASH CAPITAL, - - - - $ 400,000.00
CASH ASSETS, - - - - - 840,000.00
LOSSES PAID, - - - - - 1,800,000.00

THIS COMPANY DOES A GENERAL MARINE BUSINESS on the GREAT LAKES.
AGENTS AT ALL PRINCIPAL LAKE PORTS.

The Martin-Barriss Co.

IMPORTERS AND MANUFACTURERS OF

Mahogany, White Mahogany,

AND ALL NATIVE CABINET WOODS.

HIGH GRADES OF KILN DRIED WOODS FOR CABIN WORK AND INSIDE TRIM.

White Oak Timbers and Plank

CONSTANTLY ON HAND AND SAWED TO ORDER ON SHORT NOTICE.

654 Seneca Street, Cleveland, Ohio.

ERIE RUBBER CO.
ERIE. PA.
Manufacturers of the
KEYSTONE MARINE VALVE
THESE
RED RUBBER VALVES
ARE THE
BEST AIR & FOOT VALVES MADE.
IF YOUR DEALER DOES NOT KEEP THEM, WRITE DIRECT TO THE FACTORY.

COAL
STANLEY B. SMITH & CO.
OPERATING
SMITH'S COAL DOCK,
Detroit, Mich.
Pocket Fueling and Low Dock,
—ALSO—
LORAIN COAL DOCK,
Lorain, Ohio.
LAKE SHIPPERS OF STEAMBOAT AND STEAM COAL.
STEAMBOAT FUELING

INCORPORATED 1794.

Insurance Company of North America.

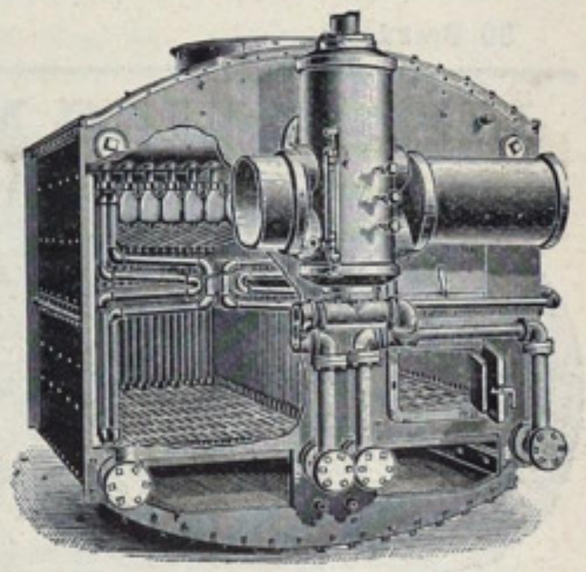
CAPITAL, Paid up in Cash, - - $3,000,000.00
ASSETS, . - - - - - - - - 9,744,513.70

CHARLES PLATT, President. WILLIAM A. PLATT, Vice-President.
EUGENE L. ELLISON, 2nd Vice-President. GREVILLE E. FRYER, Sec'y. & Treas.
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department.
GEORGE L. McCURDY, Manager.
CHICAGO, ILLS.

ALMY'S PATENT SECTIONAL WATER TUBE BOILER.

The Most Efficient and Reliable Water Tube Boiler on the Market.
is neither a copy nor an infringement of any other Boiler.



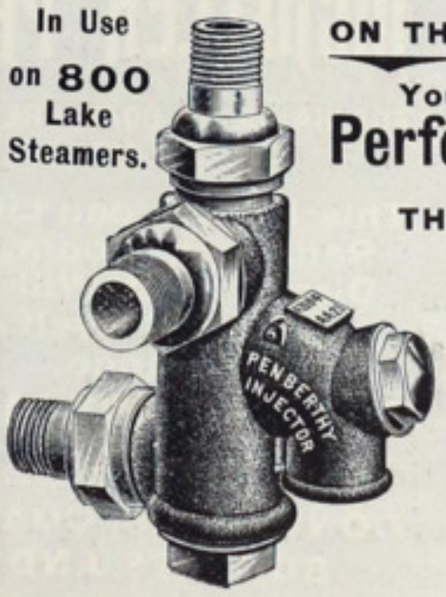
MANUFACTURED BY
The Almy Water Tube Boiler Co.
No. 47 CLIFFORD STREET,
PROVIDENCE, R. I.

THE BEST PAINTS FOR IRON
ARE MADE BY
W. W. LAWRENCE & CO.
PITTSBURGH, Pa.

RED LEAD,
Red Lead & Lamp Black,
P. R. R. Red (iron oxide),
METALLIC REDS,
METALLIC BROWNS,
GRAPHITE PAINT,
IRON FILLER,
STEEL COLOR PAINT,
CARBON BLACK.
CORRESPONDENCE SOLICITED.

WARD BOILERS FOR STEAMERS LARGE OR SMALL
LIGHT WEIGHT, GREAT POWER
THREE TYPES
LAUNCH, NAVY AND MARINE.
ADOPTED BY U.S. GOVERNMENT. WAR VESSELS, LAUNCHES, REVENUE CUTTERS, TUGS.
AFTER THE MOST EXHAUSTIVE COMPETITIVE TESTS. Correspondence Invited.
CHARLES WARD,
CHARLESTON, KANAWHA CO., W. VA.

In Use on 800 Lake Steamers.



ON THE LAKES In Rough Weather You Want a
Perfectly Automatic Injector.
THE **PENBERTHY**
Is the only one which will give you satisfaction.
SEND FOR CATALOGUE.

PENBERTHY INJECTOR CO.
Detroit, Mich.
See our exhibit, Section 25, Mchy Hall, Worlds Fair.